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See Advert. Page 15



"THE TIMES" OF THE TRANSPORT WORLD

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LONDON, APRIL 5, 1958

**START
OF THE
BIRMINGHAM
MOTORWAY**

See Page 3

PRICE NINEPENCE

Arbitration and Findings

In a letter to *The Times* Sir Godfrey Ince, former Permanent Secretary to the Ministry of Labour and National Service and a member of the Economic Planning Board, points to what may be a disturbing development in our industrial relations system—the tendency to regard voluntary arbitration as merely a stage in negotiation. Willingness to accept awards with no legal sanction behind them, he says, has hitherto been implied when two parties jointly agree to refer their dispute to arbitration. If an award is now to be questioned because it is not entirely satisfactory to one of the parties, a tribunal reference which was intended to bring about a settlement of the dispute will become no more than a device to test out the views of an outside body which can then be accepted or rejected at will. This would mean an end of arbitration as a means of preventing industrial strife, and those concerned with negotiation in industry should pause before inflicting such a damaging blow upon a system which has taken so long to build up and has brought such benefits to the country. Arbitration in all walks of life pre-supposes acceptance of findings: the principle is at the very root of ordered society, and neglect of it may spell industrial chaos. Awards, however, should be accompanied by explanation of the reasons therefore, and to this extent the present arbitration machinery needs adjustment. So far union leaders, in respect of arbitration decisions, have shown little disposition to persuade their members to be as accommodating as the employers. In fact, in the case of the London busmen, not only is there rejection of an award but refusal to co-operate with the Executive (by which it was accepted at the outset) in measures to meet higher costs antecedent to those arising from the award.

Forward-Looking Kew Dodge

DESCRIBED in our issue for March 8, at the time of their first announcement by Dodge Brothers (Britain), Limited, several examples from the new Dodge Forward Look range of commercial vehicles were on show at the company's works at Kew last week. With full forward control and a strikingly modern frontal appearance characterised by a large one-piece curved windscreen, said to be the largest yet offered in a British-built lorry, the range is comprehensive and appears to fulfil the design aim of covering the majority of haulage requirements in the 5- to 7-ton field as well as tractive power for articulated vehicles of up to 40,000 lb. gross weight. The new range supersedes the company's semi-forward-control range but supplements the bonneted N series, which remains in production. The forward-control range comprises 21 different chassis with three wheelbase lengths offered in each of the nominal payload classes of 5, 6 and 7 tons. Apart from the usual operating advantages of the full forward-control layout of greater body space for a given wheelbase, the new Dodge chassis embody a number of important mechanical improvements which will enhance an already high reputation. Among them are increased chassis frame dimensions, heavier front axles, dual-rate road springs with thicker main leaves, a more powerful braking system on 5- and 6-ton chassis and power-assisted steering as a standard fitment on 7-tonners and as an optional extra for all other diesel-engined chassis. The 7-ton chassis can also now be fitted with air pressure-hydraulic brakes and a 351 cu. in. direct-injection diesel engine is now offered as one of the two diesel units for this chassis.

Scotland's Battery Railcar

HEADED by the chairman, Sir Ian Bolton, Bart, members of the Scottish Area Board of the British Transport Commission, along with the Right Hon. Thomas Johnston, chairman, and members of the North of Scotland Hydro-Electric Board, and Mr. James Ness, general manager of the Scottish Region of British Railways, were among a large party of civic and county

CURRENT TOPICS

representatives and a cross-section of commerce and industry and the press who travelled on the new battery railcar from Ballater to Aberdeen last week when an inaugural demonstration was given. This experiment on the Deeside line, of which we shall publish an illustrated description later, will be carefully watched. It is a result of collaboration between the British Transport Commission, the North of Scotland Hydro-Electric Board, and two private enterprises, Bruce, Peebles, Limited, which supplied the charging plant, and Chloride Batteries, Limited. If successful it may provide a solution to some of the problems of maintaining rail services on uneconomic branch lines.

centenary year and with great perspicacity and considerable difficulty Aer Lingus obtained authority to operate a twice-weekly service between Dublin and Rome via Lourdes. As the only direct operator between two great centres of Catholic pilgrimage its prospects are promising, and travelling on the second flight we were struck by the signs that traffic was already developing. There did not seem so much interest in Italy itself, but the connections that are made in Rome are numerous and should go far to make up for the mental wear and tear which is likely to be caused at an airport where control has done anything but improve in the years we have known it.

railway brakes, road vehicle brakes and power steering, steam heating equipment for railway carriages, every description of railway signalling equipment, rectifiers and other electrical apparatus, mining equipment including colliery tub handling gear, and industrial pneumatic control gear are being manufactured. The visitors were therefore able to inspect a wide range of processes involving units for many products and were particularly impressed by the high quality of design and workmanship. The party was led by the president of the Institution, Mr. E. S. Cox, and was welcomed by Mr. Mervyn Shorter, managing director of Westinghouse Brake and Signal Co., Limited.

Bus Station at Bath

WHATEVER their amenity value, it can be said of bus stations in general that they add to the cost of operation without making adequate contribution to the revenue of the bus undertaking. There is special justification for the £90,000 Manvers Street Station of the Bristol Omnibus Company in Bath, however, in that it occupies a bomb-damaged site near Bath Spa railway station with a building of architectural distinction and that it replaces three scattered stances for country buses running out of Bath at Grand Parade, Old Bridge and Queen's Parade. Interchange between the 23 country routes operated by Bath Services will thus be made easier. An administrative advantage is that the office staff of the Bristol company's divisional traffic superintendent (Southern), who deal with all the Bath Services operations, will be concentrated in the pleasant offices on the station premises with better working conditions. The station was formally opened on Monday of this week by Councillor Tom Jones, Mayor of Bath, who was presented with a commemorative key by Mr. Stanley Kennedy, chairman of the Bristol company and of the Tilling Group Management Board. At a subsequent luncheon Mr. Kennedy paid a tribute to the co-operation of the police and of the council and its officers not only in the preparation of the scheme but in the day-to-day conduct of business.

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The Aberdeen—Ballater branch has been chosen because it has many features which will give the new battery car a thorough test. The distance from Aberdeen to Ballater is 43½ miles; batteries will be charged at Aberdeen and again at Ballater. The maximum gradient is 1 in 68 so that the powers of acceleration of the vehicle and ability to climb will be amply tested. There are 12 intermediate stations on the branch and there is a fair passenger traffic capable of being increased. The vehicle was assembled at British Railways Carriage Works, Cowlers, from standard diesel railcar equipment, but with motors and control equipment supplied by Siemens-Schuckert (Great Britain), Limited; this apparatus was manufactured by Siemens-Schuckert and Schaltbau in Germany and is standard with well-proved units on the German Federal Railways.

Pilgrims by Air

ONE of the most energetic of the smaller national airlines and ready to take the lead in developing new traffic if there seems any reasonable possibility of its materialising, Aer Lingus has this year provided another example of its ingenuity. With a substantial majority of its countrymen practising Roman Catholics it was among the first airlines to realise the possibilities of operating services to the great pilgrimage centre of Lourdes in the Pyrenees. Subsequently this operation was improved by extending the route to Barcelona, thereby affording not only a facility for the Spaniards but also for others who could reach Barcelona by connecting services. Expansion of European operations last summer brought a new service from Dublin to Rome via Manchester and Zurich, while Vickers Viscounts also took over responsibility for the Barcelona route. Apart moreover from the scheduled operations there has also been a substantial amount of charter traffic for special pilgrimage parties. This year is the Lourdes

Newport River Bridge

ONE of the most urgent problems of road communications remaining for Wales and Monmouthshire is the necessity for a second road bridge over the River Usk at Newport, says a letter to the Minister of Transport from the Industrial Association of Wales and Monmouthshire. The statement was made at the quarterly meeting of the South Wales Executive Committee, when full accord was expressed with the view that the confluence of traffic at the existing bridge constitutes a problem of the first magnitude in the borough itself and the approaches to it. In some respects, the letter continued, it would appear that the situation at Newport is much the same as at Port Talbot, where the differences between a plan prepared by the Ministry of Transport and an alternative proposal by the local authority were responsible for a delay of some five years in obtaining a decision on either. The Association has indicated to the Minister that industrial interests are pleased to learn that at Newport a consulting engineer has been commissioned with a view to resolving the twin problems of through and local traffic.

Versatility at Chippenham

MEMBERS of the Institution of Locomotive Engineers last week enjoyed the hospitality of Westinghouse Brake and Signal Co., Limited, at that company's Pew Hill works, Chippenham. Begun originally as a railway signal factory by Evans O'Donnell and Company in 1895, the works were acquired in 1903 by Saxby and Farmer, Limited, which in 1920 merged with Westinghouse Brake Company (the London works of which were established in 1876) and McKenzie and Holland (a Worcester firm dating from 1862), as Westinghouse Brake and Saxby Signal Co., Limited. By 1932 brakes as well as signals were being dealt with at Chippenham; today the versatility of production is considerable, as air and vacuum

In the Spring the Railfan's Fancy

WITH the advent of spring, the Railway Correspondence and Travel Society 1958 programme of rail tours got off to a good start on March 29, when 250 members and friends spent the sunny afternoon exploring the Angerstein and Deptford Wharf branch lines. The train, a vintage three-coach push-and-pull set in charge of an ex-South Eastern and Chatham Railway 0-4-4T No. 31518, first proceeded from London Bridge to New Cross Gate, where we noticed with a twinge of nostalgia that the historic locomotive depot, which dated from 1839, has now been levelled to the ground. After reversing the train was propelled along the branch to Deptford Wharf, whence it returned via the Ballarat road to New Cross Gate for a traverse of the Bricklayers Arms branch, and so via New Cross to the Angerstein branch at Charlton. All this gave an admirable impression of that vast No Man's Land of intricate trackwork which now straddles the area which was once known as the Deptford Marshes but was transformed by the London and Greenwich Railway in 1836. Having examined the interesting, but now somewhat faded, attractions of Mr. Angerstein's wharf, the train returned to Blackheath, where its engine was replaced by an ex-Great Eastern Railway 0-6-0T. Then via New Cross and the East London Line, it ran through the Thames Tunnel to Liverpool Street Station. Here, as if to redress the antiquarian bias of the outing, our venerable steed drew in alongside a train of multiple-unit electric stock, whilst in an adjacent platform stood a brand-new main-line diesel-electric locomotive. The implication of this striking contrast seemed clear. Railways indeed have their roots in the past, but also have a virility which should carry them far into the future.

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Here you see cement being discharged from the special
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MODERN TRANSPORT

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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

World Leadership

IT has become fashionable for the people of these islands to decry their own efforts, but we have long suspected that the time when it was right to do so has passed, since the world is inclined to take a man at his own valuation. The ease with which the British run down their own transport systems is notorious; as recently as last week we had a typical letter from an Englishman abroad complaining about the decor of a British product in the transport field and in particular about the workmanship of one of its features. A little inquiry in the field and a less ready assumption to blame his fellow citizens would have demonstrated to him, as we were able to do, that the painting scheme was, of course, specified by the customer and that it was the customer who had insisted upon the feature of doubtful workmanship being purchased from a Continental supplier. In point of fact, our vast upsurge in exports, particularly noticeable in the car and commercial vehicle trades, our record shipbuilding output and other praiseworthy features of our overseas trade could not have been sustained without first-class design and productive skill, aggressive salesmanship, and the capacity to produce what the customer wants. Readers will be aware that we have reiterated constantly some of our internal transport feats—a busier railway system than any other in the world, with our smallest region handling as many originating passengers as all the Class I railways in the United States, and a greater network of bus routes than any other country in the world with, for example, 2½ times the number of public service vehicles than in the very much larger territory of France. Now comes the welcome news that the Treasury has taken a hand in telling the story of British achievement in its latest monthly bulletin for industry.

Exploding Myths

TRUMPET-BLOWING and flag-waving are not activities normally associated with the Treasury, but the monthly bulletin published this week sets out with the aim of "exploding some myths" and showing "the other side of the picture." Among the statements about Britain's efforts since the end of the war are that production has increased by a third in the last 10 years, that exports are double the prewar level and that Britain leads the world in several important fields of technology. Especially heartening in view of successive gold and dollar crises is the changing pattern of our exports, 16 per cent of which now go to dollar markets compared with 11 per cent in 1938. Since 1951, the percentage taken by the United States has risen from 5½ to 7½ per cent of the progressively rising level of exports. Other facts revealed in the bulletin are that investment now takes a much larger share of the national income than before the war; that sterling finances nearly half of the total world trade and payments; that Britain is investing overseas a higher amount per head of population than any other nation; and that we spend more per head on defence than all but one of our allies.

Growth of New Industries

SPECTACULAR growth of the electronics industry has resulted in a five-fold increase in size and there has been a big advance in chemicals since 1948, with particularly impressive expansion in petro-

chemicals and plastics. The role of new exports such as diesel engines and locomotives, earthmoving machinery, electronics equipment, refined petroleum, plastics and antibiotics has become more important year by year, says the bulletin. All engineering products together now provide nearly half of the expanded total production compared with just over a quarter before the war and the contribution of mechanical engineering to total manufacturing output has risen by a half in the same period. The vehicle industry has increased its contribution by almost as much. Our share in total world trade in electrical machinery and apparatus has risen from one-tenth to over a quarter, in passenger cars from a sixth to over a quarter and in tractors from a twentieth to over a quarter. A high and rising rate of investment since the war has enabled technological advance to be translated into productive capacity. Britain is the world's second largest market and second largest supplier—the first per head of population. A most striking fact is that all the turbine-engined aircraft at present flying in the western world are British built.

Industrious British Workman

ON labour questions, the bulletin indicates that the average British workman works longer and harder than many of his contemporaries in other countries. Time lost through strikes in Britain is about a tenth of that lost through industrial accidents and a hundredth of that due to sickness. Between 1951 and 1954, time lost per worker through strikes in the United States was eight times the British figure; in Canada and Australia it was four and a half times and in France three and a half times as much. Only in Sweden, the Netherlands and West Germany were records better. Average hours worked per week in manufacturing have increased from 44.9 in 1948 to 45.9 in 1957 and are now only slightly lower than in 1938. Britains work about six hours longer a week than Canadians, nearly seven hours longer than Americans and, since the second quarter of 1957, a little longer than West Germans. Production per man employed in manufacturing increased by about a quarter between 1948 and 1956, and in agriculture it went up by two-fifths. Unemployment has increased in most countries during the past 12 months but the increase has been less marked in this country than elsewhere. The present rate in the United Kingdom, where the national average is under 2 per cent compared with nearly 8 per cent in the United States, is lower than in all but one of nine countries listed in the bulletin. All this is greatly at variance with what the bulletin describes as "the strange view that the country is living on its past, careless of its world responsibilities" and we trust it will give a little heart to many of our friends who have gravely—and mistakenly—shaken their heads over the future of Britain.

Forthcoming Events

- April 5.—Light Railway Transport League. Visit to Aberdeen Corporation Tramways.
- April 6.—Light Railway Transport League. Visit to Glasgow Corporation Tramways.
- April 8.—Institute of Road Transport Engineers (Midlands). Annual general meeting. At Birmingham Exchange and Engineering Centre, Stephenson Place, Birmingham, 7.30 p.m.
- April 9.—Light Railway Transport League. Paper by Mr. G. E. Baddeley, "The Continental Steam Tram." At 153 Drummond Street, N.W.1. 7 p.m.
- April 10.—Institute of Road Transport Engineers (Western). Annual general meeting. At Angel Hotel, Westgate Street, Bath. 7 p.m.
- Tramway Museum Society. Visit to Kingsway Subway. 6.30 p.m.
- Light Railway Transport League. Paper by Mr. F. K. Farrell, "The Last Years in London." At Exchange and Engineering Centre, New Street, Birmingham. 7.30 p.m.
- April 11.—Institute of Road Transport Engineers (South Wales). Annual general meeting. At South Wales Institute of Engineers, Park Place, Cardiff. 7 p.m.
- Railway Correspondence and Travel Society (London). Paper by Messrs. G. W. Morant and H. Luff, "Narrow Gauge Wandering in Europe." At Railway Clearing House, Everholt Street, N.W.1. 7.30 p.m.
- Institution of Highway Engineers (London). Symposium of six contributions, "Trends in Road Foundations." At Institution of Structural Engineers, 11 Upper Belgrave Street, S.W.1. 5.30 p.m.
- April 12.—Railway and Canal Historical Society (London). Paper by Mr. H. Paris, "The Board of Trade and the Railways." At Railway Tavern, Liverpool Street, E.C. 7 p.m.
- Stephenson Locomotive Society (Scottish). Paper by Mr. R. Hardy, "G.C., G.E., and Stewart's Lane." At 302 Buchanan Street, Glasgow. 2.30 p.m.
- Stephenson Locomotive Society (North Western). Paper by Mr. W. Hennigan, "The Holmes Locomotives of the N.B.R." At Y.M.C.A., Fargate, Sheffield. 6.30 p.m.
- April 13-15.—Public Transport Association. Annual Conference. At Harrogate.
- June 3-6.—Institute of Transport. Congress. In Dublin. September 1-7.—Society of British Aircraft Constructors. Flying display and exhibition. At Farnborough. (Public days September 5, 6 and 7.)
- September 26-October 4.—Commercial Motor Transport Exhibition. At Earls Court.
- September 28-October 7.—International Railway Congress. In Madrid.

PASSENGER ROLLING STOCK

NINETEENTH CENTURY RAILWAY CARRIAGES

By HAMILTON ELLIS

FROM MODERN TRANSPORT: 22s.



Model of the mass concrete bridge over River Ouse on London-Birmingham motorway, with flood arches alongside; below it is a standard square span overbridge; centre, layout of one of the projected service areas, with bridge across carriageways housing the restaurant; right, a typical design for a reinforced concrete bridge carrying the motorway over an existing road

LONDON-BIRMINGHAM MOTORWAY

Spectacular Start to £20 Million Road Project

DETAILS OF 19-MONTH SCHEME

WORK began on March 24 on two of the biggest road contracts ever let on the construction of the London-Birmingham motorway, nearly 70 miles long, which is scheduled for completion in the record time of 19 months. To achieve their target date the contractors must build, on an average, one mile of double-carriageway road every nine days, although actual construction of carriageways cannot begin until earthworks and bridges have been completed over virtually the whole length. Since bridges must come first, the rate of bridge construction will average one every three days. This road, the South of Luton-Watford Gap-Dunchurch Special Road, will eventually, as far as a junction six miles short of its termination in the Dunchurch By-pass, form a section of the London-Yorkshire motorway.

As already recorded in our columns, the signal for work to begin was given by Mr. Harold Watkinson, Minister of Transport, when he performed the official inauguration ceremony at Slip End near Luton and offered his good wishes to the contractors and their staffs for the success of their enterprise. He was received by Mr. Maurice Laing, managing director of the firm of John Laing and Son, Limited, contractors for the 53 miles north-west of Luton Hoo, and by Mr. J. C. Burman, chairman of Tarmac Civil Engineering, Limited, contractors for the first 12 miles south of this point.

Ceremonial Seal

At the conclusion of his speech the Minister was invited by Mr. Laing to seal the first concrete slab, nine inches thick and measuring 5 ft. by 3 ft. which will form part of the parapet of one of the bridges. Sir Owen Williams, for the consulting engineers, handed the Minister a ceremonial mallet, with which Mr. Watkinson tapped into position a bronze seal, bearing the Ministry's crest.

There was a spectacular sequel to this ceremony when he threw an electric switch to turn a portable traffic light from red to green and to set off a klaxon horn. An "armoured column" of excavating machines broke the skyline to the south and lumbered over the hill towards the starting point. Simultaneously, another column of machines, forming the vanguard of the northern group, approached from the tipping area at one side of the route. On reaching the start line between the St. Albans By-pass and the motorway, the machines came into operation and began clearing the topsoil. After watching operations the Minister flew in a B.E.A. helicopter over the route of the motorway with a small party including Sir Owen Williams and Col. C. H. Hollott, County Surveyor of Hertfordshire. Work was also begun at the same time at various other points along the route including Newport Pagnell, Bucks, and various places in Northamptonshire.

Scheme

The London-Birmingham motorway will be the first large scale motorway to be completed in this country and the first new national highway to be built in the present century. Its construction, together with the improvement of approach roads at either end, will reduce very considerably the journey time by road between London and the Midlands. The savings in fuel and vehicle maintenance by the new route will also be considerable.

The southern end of the motorway, known as the St. Albans By-pass, will start at a point on the North Orbital Road (A405), south of St. Albans, and will join the main trunk of the motorway at Slip End, near Luton. There will be access also from A41 near Watford (Herts), and from A5 and A6, roads which will be greatly relieved by the new

route. From Slip End the route, that of the London-Yorkshire motorway, follows a north-westerly direction across the midland plains as far as Watford Gap, near Ashby St. Ledgers in Northamptonshire. At that point a short spur, to be built under the present contract, will branch off towards Birmingham, and will join the Dunchurch By-pass, for which a contract is about to be let. It is planned eventually to continue the main trunk of the motorway to Yorkshire.

Service Areas

At intervals of about 12 miles along the route there will be service areas extending on both sides of the motorway with a foot-bridge linking the two halves. These areas, roughly circular in shape, are for facilities such as petrol filling stations, parking areas, picnic sites, transport cafés, restaurants and telephones. These facilities will be developed as the need arises. The motorway will be carried over or under existing roads. At a few places, where particularly important highways are crossed, there will be two level junctions with connecting slip roads. A scheme of planting, designed to harmonise with the surrounding country, has been prepared. The Minister is being advised on this matter by a specially appointed Landscape Advisory Committee, the chairman of which is the Hon. David Bowes Lyon.

The contracts now begun are for 67 miles of twin carriageway roads including 12 miles of the St. Albans By-pass and two miles of the Dunchurch By-pass. The cost is £20 million. With work which has been completed and is to be carried out on the approaches to London and Birmingham, it will be possible eventually to travel the 100 miles between the two cities on twin carriageway roads.

Equipment Used

More than 1,000 major pieces of road-making equipment will be used when work is at its peak and 3,700 men will be engaged. Two aircraft will be operated for supervision and for bringing spares for machinery. More than 8 million gal. of fuel will be needed to keep the machinery running. Some 4 million sq. yd. of roadway will be laid.

Each carriageway of the motorway will be 36 ft. wide except on the two legs of the St. Albans By-pass and on the Birmingham Spur from Watford Gap to the west side of Dunchurch. These will be 24 ft. wide. There will be 150 bridges, including bridges over railways, rivers, canals, other roads and for accommodation purposes to enable men and cattle to pass from land on one side to land on the other without walking on the road.

There will be a 575-ft. viaduct over the River Nene, Northamptonshire, and 450-ft. viaducts over the Great Ouse and the River Ouse, Buckinghamshire. More than 90 per cent of the motorway will be on gradients less than 1 in 50. This means moving 14 million cu. yd. of earth from cuttings to embankments. Topsoil will be preserved on different sites occupying a total area of 350 acres. The soil will eventually be used for planting grass, trees and shrubs on verges and centre strips between carriageways.

Various types of earth-moving machinery will be used according to the distance it is necessary to carry the excavated earth. For long hauls there will be the latest rubber-tyred scrapers, carrying 20 to 30 tons of earth or 18 to 25 cu. yd. Elevator loader excavators fitted with giant plough blades will feed conveyor belts, which transfer earth to dump trucks. For short hauls, there will be tracked excavators. Automatic concrete mixers and pile drivers will be used for bridge works.

Carriageway Materials

The motorway will be generally laid to a depth of 2 ft. There will be 6 in. of compacted stone at the bottom. On this will lie a 14-in. course of either lean concrete or water-bound macadam, according to the availability of materials. On top will be a 2½-in. tarmacadam base course and 1½-in. asphalt wearing course. The St. Albans By-pass will consist of granular filling 7 in. deep on which will be laid 11 in. of reinforced concrete. This will be automatically spread in strips up to 24 ft. wide.

More than 20 canteens will be established at various sites and mobile canteens will operate from them. Men coming from other parts of the country to supplement the local labour force will live in hostels. Calls for spares from vehicles on site and instructions will be made over field radiotelephones; G.P.O. teleprinters will also be used.

Organisation

The Laing contract for 53 miles of motorway and 17 miles of adaptation or diversions of existing roads to join the motorway junctions or to cross the motorway by bridge or underpass is valued at roundly £15 million and is the largest of its kind undertaken by one firm in this country. Work started at once on four sites and within weeks will be going on from 20 points. The headquarters will be at Newport Pagnell. The first task of the project manager of Tarmac Civil Engineering, Limited, on the St. Albans By-pass will be to build an overwidth section of road to land the company's aircraft which will carry passengers and spare parts for machinery to the site.

Sir Owen Williams and Partners are the consulting engineers for the London-Yorkshire motorway and have designed 13 of the bridges on the St. Albans By-pass, for which the agent authority is the Hertfordshire County Council. The County Surveyor, Lieut.-Colonel C. H. Hollott, B.A., M.I.C.E., has designed the other bridges on the by-pass.

Earth Moving

Over 10 million cu. yd. of earth will have to be moved this summer during the first stages of construction of this portion of the London-Yorkshire Motorway. It is hoped that the majority of the earth moving will be finished by next November. A considerable number of Caterpillar machines were assembled for the inaugural ceremony and will be employed on the earth-moving task. There were 28 Caterpillar DW21 rubber-tyred 300-h.p. tractors with matching Caterpillar No. 470 scrapers; Caterpillar D9 and D8 crawler tractors will also be used. Other Caterpillar diesel crawlers on the operation include D7 and D4 models. Fred Myers, Limited, Caterpillar dealer, is setting up a field depot near Newport Pagnell to maintain what is one of the largest concentrations of Caterpillar earth-moving machines ever assembled in the United Kingdom for one operation.

The majority of the earth-moving operation on the St. Albans By-pass will be carried out by the Tarmac group, using six Caterpillar DW21 tractors from the fleet of B. Y. Jackson and Son, Limited. It is expected that many of the first British-made Caterpillar D8 crawler tractors, to be produced in four months' time at the new Glasgow factory of Caterpillar Tractor Co., Limited, will be used.

Fuelling

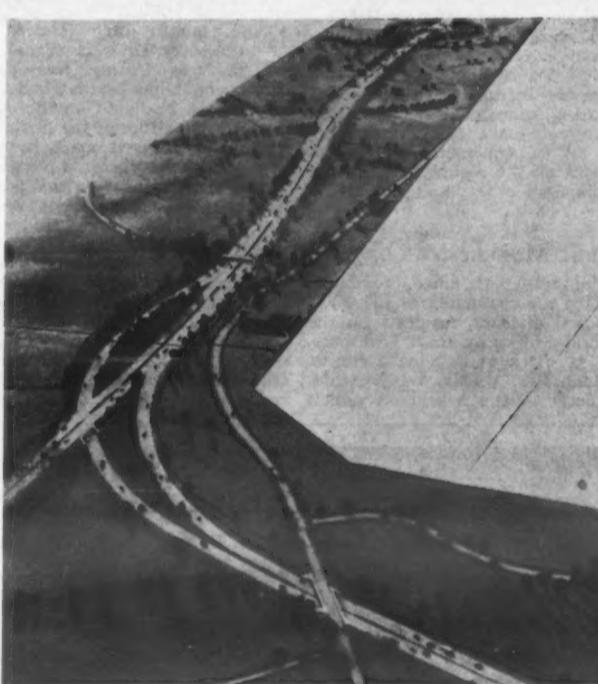
On three of the four sectors of the motorway contract Shell-Mex and B.P., Limited, is responsible for fuelling the equipment. The first of these sectors, just over 12 miles long, extends from Slip End (between Markyate and Luton) to Ridgemont (3 miles from Woburn), where the second sector begins; this carries the road a further 11½ miles to Gayhurst (2½ miles from Newport Pagnell). The fourth and most northerly sector extends from Upper Heyford to Dunchurch, a distance of 15½ miles. Using a recently built depot at Northampton as the parent supply point, the company has established fuel storage and dispensing sites in each of the three sectors for which it will be responsible—at Chalton Cross, Newport Pagnell and Watford (Northamptonshire).

At each point there will be tanks above ground for storing gas oil and derv fuel, and underground tanks for motor spirit, with electric pumps for dispensing the fuel. On the longest sector of the road (between Upper Heyford and Dunchurch) the contractors will work from dawn till dusk seven days a week; elsewhere high-pressure work will go on for six days a week. Shell-Mex and B.P. has established teams of drivers who will work on shifts to ensure that fuelling vehicles are always available to replenish the machinery when required.

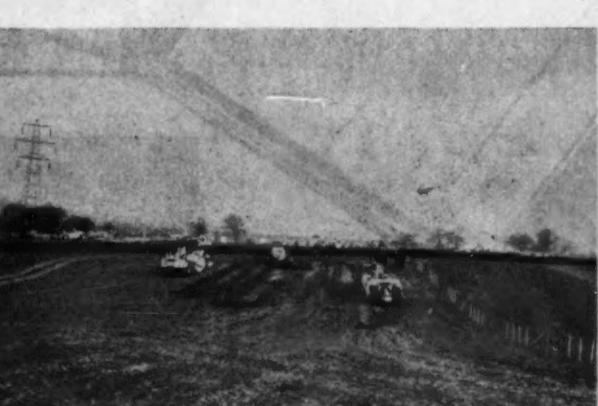
Four-Wheel-Drive Tankers

A fleet of 12 four-wheel-drive Bedford tankers, each of 950 gal. capacity, has been acquired for this operation. They are fitted with cross-country tyres to negotiate heavy ground. The conversion work on them has been carried out at the company's maintenance and repair centre at Fulham, London, enabling them to dispense gas oil, derv or motor spirit. In addition, three 800-gal. Dennis motor spirit tankers will be employed; they are equipped with hand pumping, metering and dispensing packs. These arrangements are a great advance on the use of supplies from barrels dumped on the site common in large civil engineering projects.

The fourth sector of the motorway will be fuelled by Mobil from a depot at Collingtree, where 20,000 gal. of petrol, diesel fuel and gas oil will be stored. A second depot will deal mainly with Mobil lubricants. It is expected that 60 refuellings will be made each shift.



A model to illustrate the flying junction of the Birmingham Spur and the London-Yorkshire motorway, which comes in from the left; a service area is seen towards the south and the model shows how tree planting and landscaping would be carried out



On the Tarmac contract for St. Albans By-pass a Caterpillar Series 14A D8 tractor owned by B. Y. Jackson and Sons, Limited, is pushloading a Caterpillar DW21 tractor with 470 scraper to move topsoil; centre, the busy scene at the inauguration, with the Minister of Transport's helicopter surveying the commencement of work; right, a Laing DW21 Caterpillar tractor pulling a 470 scraper while earth-moving on the London-Yorkshire motorway

LORRY—BUS—COACH**House-in-Order Warning to Hauliers**

WHAT wants road haulage nationalised? asked Mr. R. N. Ingram, a vice-chairman of the Road Haulage Association, in Cambridge last week. "I know the customer does not it," he said. "Gallup polls prove the public does not want it. A survey we have made among drivers shows that they do not want it. Even B.R.S. does not want it, according to recent press reports, and neither do many of the Socialists. Who then does want it? As far as I can make out it is merely a few Socialists with bees in their bonnets." Mr. Ingram went on to voice a warning. "I believe that a serious duty devolves upon every operator in the industry," he said. "It is to conduct his operations with such integrity and such efficiency that the prestige of the industry will be further enhanced." The reputation of the R.H.A. depended, in the final reckoning, on the manner in which its members conducted their day to day activities and it could be irreparably harmed by the misdeeds of a small minority. He hoped that in the future their critics would be denied the satisfaction of quoting the irregularities of the few to the detriment of the entire industry. This had been one of the most bitter and effective weapons in the Socialist armoury and it must be eradicated.

Earlier he had spoken of the spur of competition which private hauliers now offered to British Road Services. How effective it was was indicated by recently published B.R.S. rates for journeys from Edinburgh. In 1952 B.R.S. had had a virtual monopoly. The following examples proved the point:

Miles	1952 per ton	1958 per ton
90	28 11	25 0
200	61 3	40 0
395	108 8	85 0

Competition between independent and state road haulage must be permitted to continue for the economic benefit of the nation.

London Bus Wage Negotiations

THERE is likely to be a meeting between Sir John Elliot, chairman of London Transport Executive, and Mr. Frank Cousins, the general secretary of the T.G.W.U., to discuss the issues in the London bus wage dispute. This became known last week, also that such a meeting would probably follow the meeting on Wednesday and Thursday this week of the finance and general purposes committee of the union at which the request last week by a delegate conference of busmen for plenary powers was to be considered. In the meantime provincial busmen have delayed the formulation of their proposed wage claim.

B.R.S. in Glasgow and Edinburgh

GLASGOW and Edinburgh are to be restored as separate districts of the Scottish Division of British Road Services from April 20. From that date the existing Southern Scotland district will be reformed; the Edinburgh district will consist of the present Edinburgh branch, and the Glasgow district will consist of the remainder of the existing Southern Scotland district. Mr. J. Kirkland, at present district manager, Southern Scotland

district, will be district manager, Glasgow district, and Mr. L. S. Jack, at present branch manager, Edinburgh branch, will become district manager, Edinburgh district.

Visit to Oldham Bus Undertaking

MEMBERS of the North Western and Yorkshire branch of the Omnibus Society who visited Oldham Corporation Passenger Transport Department on a Wednesday last month, noted the compactness of the Wallshaw premises, which include a garage, maintenance depot, administration offices and even a concert room in one site. This undertaking still operates a large fleet of prewar Leyland buses in very good order, and the splendid condition



The quality finish of the E.R.F. cab is evidenced in this illustration of a model LK44 6-tonner on a London building site; right, a Southern Region Austin articulated parcels van in course of delivery

They Don't Know Themselves

WHAT was the mystery of the success of mystery coach tours, Mr. C. R. Hodgson, chairman of the South Wales area Traffic Commissioners, asked Mr. A. H. Silcox, traffic manager of United Welsh Services, Limited, in his court this week. "Perhaps we select Porthcawl for a mystery trip, but when the day comes it's raining like blazes at Porthcawl,



in which Oldham buses are maintained was observed by the O.S. enthusiasts.

Sub-Contractors' Conditions

CONDITIONS of sub-contracting have been recommended to its members by the National Conference of Road Transport Clearing Houses. They follow the standard conditions of carriage published in May last year. A clearing house may deduct 2½ per cent from a haulier's account if he has no goods-in-transit insurance to cover his liability to the clearing house, but no limitation is placed on the commission which the clearing house may charge. A sub-contractor will be required to comply with all the requirements of the Road and Rail Traffic Act, 1933, and subsequent legislation.

Reed Transport Manchester Office

ITS first provincial transport office, combined with a sales office for customers of the Reed group paper and board division, results from the opening of a Manchester office by Reed Transport, Limited, on March 31. It is at Provincial House, 123 Deansgate, Manchester, 3. Mr. W. J. Atkinson, formerly in charge of the A-licensed vehicle

and who wants to go there on a rainy day? We can change the venue and go somewhere else," replied Mr. Silcox. The South Wales Transport Co., Limited, and United Welsh Services were licensed to operate 14 additional mystery tours this summer.

Cost of Issuing Free Passes

LAST month Mr. Justice Harman, in the Chancery Division of the High Court, ruled the cost of issuing free passes to old age pensioners, blind persons and disabled ex-service men should be based on the division of the total yearly expenditure of the undertaking by the total number of journeys made by fare-paying passengers and pass-holders. Liverpool Corporation has thus won its dispute on this point with Litherland Urban District Council in respect of Liverpool Transport bus services. Under the Public Service Vehicles (Travel Concessions) Act, 1955, certain boundaries were fixed within which residents are permitted to enjoy the privilege of free travel, provided the Council in whose area the residents live is willing to reimburse the operator towards the cost of the concession. Liverpool City Council decided to contribute £2 10s. annually to its transport undertaking for each free pass issued to residents in Liverpool, and all the other local

authorities served by Liverpool buses, except Litherland, agreed to make a £2 per capita contribution.

Litherland U.D.C. asked the High Court to interpret the Act as meaning that the cost had to be judged by the actual administrative cost of the scheme, e.g. printing and distribution of passes, but Mr. Justice Harman said that it did not seem to him unfair to estimate the cost on an average basis and that there was, in fact, no other way of doing it. He would, therefore, adopt the method put forward by the Liverpool Corporation. Litherland has a population of 24,390; in July, 1955, there were 715 old age pensioners, 38 blind persons, 18 ex-servicemen and one disabled civilian with travel concessions. The decision is still subject to a possible appeal by Litherland.

Official Log Sheet Proposed

THE Scottish Horse and Motormen's Association wants a system of officially stamped lorry driver's log sheets, dated and numbered, allowing one sheet to be used each day to eliminate the "falsification and duplication which was taking place at present." This move was made at the annual conference. The log sheets, it is suggested, should be secured from post offices or police offices, and be dated for the date of issue.

Thrice Weekly Continental Ferry Service

FROM April 14, the Transport Ferry Service will be maintaining a schedule of three sailings weekly in each direction between Tilbury and Antwerp, instead of the present twice weekly sailings. Commenting on the new schedule, Mr. John H. Bustard, general manager of the service, says: "At a time when ships are being laid up it is most encouraging for us to be able to bring another ship into service." During the last 15 months traffic has increased threefold, and there is every sign of further steady expansion as British road hauliers establish reciprocal arrangements with European contractors.

Bus and Coach Developments

While the railway bridge at Ilford Station is being widened, London Transport bus and trolleybus routes are being diverted in the north-south direction via Hainault Street, involving 270 yd. of temporary trolleybus overhead wiring.

Liverpool Corporation Passenger Transport Department intends to introduce new limited stop bus routes 544 between Northwood and South John Street and 579 between Lee Park and South John Street (peak hours only).

From March 30, Crosville Motor Services, Limited, reduced the running time of its Liverpool-Warrington via Cronton service by 10 min. and re-routed it in and out of Liverpool via Edge Lane, instead of Wavertree Road. It now runs hourly instead of every 75 min.

London Transport buses on routes 484, 484A and 484B serving the L.C.C. Britwell Estate, near Slough, on weekdays were extended to serve the northern part of the estate on April 2. They continue from their previous terminus at Monksfield Way along Doddsfield Road to a new terminus at Kiddsminster Road.

By re-routing its bus route 85 which runs from Garston and Pier Head, Liverpool Corporation Passenger Transport Department has provided a service between or near Central Lime Street and Exchange stations and Pier Head since March 31. Special buses have hitherto been operated to Pier Head at busy periods in connection with sailings.

From April 8 Birch Brook, Liverpool, is curtailing its Hitchin-Welwyn Garden City route (204) at Whitwell and the Luton-Welwyn Garden City route (205) at Kimpton; journeys from Hitchin or Luton to Bendish will be withdrawn. Neither route will operate on Sundays. Kimpton to Welwyn Garden City will be covered by a new London Transport service (315) with connecting journeys on Mondays to Fridays in peak hours.

Revised timetables introduced by Maidstone and District Motor Services, Limited, on March 23 include the complete withdrawal of Services 21 (Ashford-Westwell on weekdays), 92 (Wadhurst-Crowborough on Saturdays only) and 123 (Maidstone-Stockbury). In addition the Tuesday and Thursday journeys on 107 (Tunbridge Wells-Chiddingtonstone) have been withdrawn, leaving the route as a Saturday operation.

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LONDON ROAD TANKER OPERATOR

Monkton Motors Fleet

DOUBLE-SHIFTING ON PETROLEUM DELIVERIES

HAULIERS of bulk liquids have increased both in numbers and in fleet strength during postwar years, notably since the vast domestic oil refinery programme got under way, but expansion in other fields reflects also the remarkable changes which have taken place in handling petroleum products, chemicals and edible oils in quantity. From modest beginnings in 1939, Mr. W. T. Monk has built his Uxbridge business, Monkton Motors, Limited, into a road tanker fleet of 32 vehicles running over 800,000 miles annually and with a turnover last year of £110,000.

At the very outset it was general haulage, with a 1932 Karrier bus chassis converted into a lorry, acquired with a £25 endowment policy, but activity switched to tank haulage during the war, two vehicles delivering tar or bitumen from London and Peterborough gasworks to R.A.F. stations in Suffolk. A limited company was formed in 1949 and four years later operations were transferred from South Harrow to the present depot in Uxbridge Trading Estate. Here, Monkton Motors took over an attractive modern single-storey office block and has since substantially enlarged a building, now covering some 3,500 sq. ft., in which major overhauls can be carried out on three or



An A.E.C. eight-wheeler in the Monkton Motors fleet which hauls 2,500 gal. of caustic potash from a plant at Droylsden, near Manchester; right, another A.E.C., new in 1940, and now overhauled and equipped with new cab



four vehicles simultaneously. This garage, incidentally, is constructed in contrasting shades of Uxbridge flint brick, brown and cream.

Fleet Details

With the exception of two ex-R.A.F.-type A.E.C. six-wheeled aircraft refuellers, one at London Airport, one at Bovingdon, the entire fleet is made up of economical eight-wheelers, 21 of them A.E.C. and nine Atkinson (four with A.E.C. 11.3-litre diesel engines). Thirteen vehicles in the fleet are A-licensed, the remainder (again excluding the refuellers) are on contract A-licences. The use of maximum capacity tankers is now fairly standard, certainly for petroleum products, in order to realise the greatest benefit from bulk handling and to spread standing charges and wage costs. The newer vehicles all have tanks supplied by Darham Industries; the cost of a road tanker in the 3,300-4,000 gal. class is £6,000-£8,000, depending on the construction of the tank and the pumping equipment specified. The unladen weight can easily run out at 9½ tons.

Like most tanker operators, Monkton Motors carries a bewildering variety of liquids (and some not so liquid) in the course of a year. Solvents, caustic liquids, emulsions, edible oils and fats (perhaps 90 tons in a week) and 3,000 gal. of hot glue at a time, constitute common loads outside the petroleum industry, but fuel oil, motor spirit, jet fuel and aviation spirit, together with tars and bitumen, naturally call for a vast programme of movements. These latter traffics can be highly seasonal; bitumen is used primarily in summer for road making, while a cold snap during the winter

to telephone Uxbridge for further orders. The control of personnel in these circumstances is itself of major importance. New drivers are taken on if possible on the recommendation of an established driver and after an on-the-spot interview the newcomer is given a week with the regular man in order to see how he makes out, not only in the handling of a heavy vehicle, but also with its pumping equipment and ancillary gear.

First and foremost as a recipe for success in tank haulage, Mr. Monk places service to the customer; second comes clean tanks. About the most certain way to lose an existing customer is to allow his product, say a water soluble fluid, to be ruined on contamination by oil or fat. Working for oil companies with their own splendidly maintained fleets is something of a challenge to the smaller operator who may not be in a position to equal their garage resources, but Monkton Motors has successfully demonstrated in the past that initiative and improvisation can fill the breach.

There was, for example, the vehicle which limped in at 4 p.m. with piston ring trouble. It had to be available for the night shift compounding at 7 p.m. A conference was held between the management and fitting staff with the result that by working in relays the workshop staff cleared the vehicle by 9 p.m., with a consequent delay to the night driver of only two hours. In a more serious spot of trouble, a completely immobilised tanker had its engine exchanged with one drawn from a vehicle not required immediately in four hours one afternoon in order that it could go out the same evening. Mr. Monk is frank to admit that he was



Four Atkinson 3,300-gal. fuel oil tankers help to keep the Neasden generating station of London Transport supplied with about 230,000 gal. of oil weekly

forces up the demand for fuel oil for heating factories, hospitals, office blocks. At such periods the aim now is to make night deliveries wherever possible.

Airline Needs

From October to April vehicles are busy delivering fuel oil from Purfleet or Hammersmith to customers throughout the Home Counties, but when the airlines commence their summer workings in or around April, carrying through to October, some of these tankers will be drawn off to run between Purfleet and London Airport with aviation spirit of kerosene.

Periods of heavy demand mean close scheduling for these tankers. Some are double shifted, the day driver working from a distribution depot at Fulham on "bridging" deliveries, i.e. staging bulk supplies to depots of the oil company. After completing perhaps two such trips he will return at about 6 or 7 p.m. to Fulham where a night driver takes over, running out to Purfleet for a load to London Airport. Weekly mileage on this sort of work is about 750 and the vehicles are hired on the basis of standing charges, wages and mileage rate for all miles run. There is an additional payment for Sunday wages; night work is paid for at mileage only since standing charges have already been covered.

No tanker operator can expect to make a living off the traffic in his own backyard, as it were, and if he is to expand he must tender for or otherwise seek movements anywhere in the country in order to keep his vehicles profitably employed.

lucky in the early days, when he was performing some indifferent vehicles, that that was a period when demand outstripped supply, but now, of course, he has won the confidence of the oil company concerned and others prepared to entrust their transport needs to contractors.

Rebuilding Earlier Vehicles

Some 10 or a dozen of the A.E.C. eight-wheelers, including chassis dating from as far back as 1936, are being fully reconditioned in the workshops and in certain cases the latest type of cab is being substituted to give them a new lease of life. The workshop is used for everything except the usual specialist processes on crankcases and crankshafts; fuel injection equipment maintenance is also placed out. The proximity of the A.E.C. service factory at Southall, coupled with the good spare parts service rendered, are useful assets.

The importation of members' cars, hitherto carried out by the Automobile Association, has now been handed jointly to professional agents, Lep Transport (as already mentioned) and Claridge, Holt and Co., Limited, of London, Liverpool and Coventry. The latter firm, which is the parent company of Motor Packing Co., Limited, of Canley, Coventry, has been packing and shipping for the motor trade since 1910 and has served the Automobile Association for many years. Its experienced staff deals with all the problems of private importations of motor vehicles and clearance through Customs, servicing, registration and road insurance.

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ROAD VEHICLE INDUSTRY

Air-ride Bus in Belfast

AN interesting phase of Belfast's passenger transport history was inaugurated on March 27 when, at a ceremony outside the City Hall, Mr. J. W. Shirley, director and general manager, Park Royal Vehicles, Limited, and Mr.

wheel chassis to carry 70 passengers. Our readers will recall that the Bridgemaster is a 70-seat vehicle in which, by employing integral construction, overall height has been kept to just under 13 ft. 6 in. with orthodox seating layout



Typical of the rugged country covered by the Perkins mobile school (P4-engined Dodge 3-tonner) during a tour of the Argentine taken on the road between Cuevas and the Chilean border; right, typical of the rugged conditions in the china-clay mines of Cornwall where this Rootes light diesel-engined Commer 1½-tonner is reported to be operating extremely satisfactorily

Philip Rackham, director, A.C.V. Sales, Limited, handed over the first air suspension Bridgemaster double-deck bus to go into municipal service to Mr. J. Mackle, general manager, Belfast Corporation Transport Department. The Bridgemaster is a prototype vehicle purchased by Belfast Corporation to test independent suspension, with a view to buying a new fleet of roo trolleybuses thus equipped, and to study the suitability of a four-

and normal headroom. Air suspension is offered as an alternative to coil-spring suspension.

Rover Continental Touring Service

FOR the forthcoming touring season and throughout the year, the Rover Company through its distributors is again offering the Rover Continental touring scheme for Land-Rover owners tour-

ing on the Continent. The scheme is operated on a coupon basis and enables owners to pay in this country for repairs that may become necessary while they are in Europe. All Rover distributors have details of the scheme.

Daimler Freeline Brochure

NOW available from Transport Vehicles (Daimler), Limited, G.P.O. Box No. 29, Coventry, is a new brochure describing the latest version of the Daimler Freeline single-deck passenger chassis. The Freeline is a versatile vehicle available with a wheelbase up to 20 ft. 4 in. to take a 64-seat 35-ft. body and with alternative engine and transmission arrangements, including the Daimler air-operated automatic or semi-automatic epicyclic gearbox. The specification includes powerful diaphragm-operated air-pressure brakes and pneumatic power-assisted steering.

Dagenite Commercial Vehicle Battery

THE range of Dagenite commercial vehicle batteries has been extended with the introduction by Holsun Batteries, Limited, of a new 6-volt battery type 3GR27-Y. Unusual constructional features include the use of copper-cored terminal pillars and intercell connectors, which provide greater starting efficiency than the conventional solid lead components. Porvoric separators are used and the plates are of standard G dimensions. The container is moulded in hard rubber. Primarily, the battery is designed for the 1957-58 S-type Bedford diesel, which uses two 6-volt units.

Surform Range Additions

FOUR new Surform tools have been introduced by Simmonds Aerocessories, Limited (a member of the Firth Cleveland Group) incorporating the distinctive blade invented by Firth Brown Tools, Limited. The new tools have been designed for jobs which require more precision than can be obtained with a general-purpose flat tool. The Surform block plane (No. 111) has a fine-cut blade which gives excellent performance when used for quick one-handed smoothing of edges and small surface areas, especially in awkward places. The Surform fine-cut file (No. 102) is designed to give

a smooth, clean cut on mild steel and other tough materials. The Surform convex plane (No. 105) is a fine-cut tool of particular value for spot trimming and smoothing metal vehicle bodywork and is also useful in the general building and boat-building industries. The Surform half-round file (No. 103) gives quick results on concrete surfaces. The Surform blade gives controlled depth of cut with minimum pressure and as cuttings pass through perforations in the blade, clogging is obviated—a point of particular interest to users of plastics and other materials liable to clogging. Surform specially shaped tools are also recommended for use on all metals, wood and timber products.

Rust Protection for Motor Vehicles

CLAIMED to check rusting of such parts as bodies, wings, chassis, exhaust pipes and so on throughout the life of a vehicle, a new metallic fluid specially developed for use on motor vehicles has been introduced by Corrosion, Limited, 16 Gloucester Place, Portman Square, London, W.1. Named Glopane Neverrust Autograde, the material is applied in the same way as ordinary paints and dries quickly to a matt finish that is said to be ideal for the reception of any of the normally used finishes. Main distributor for Glopane in the south of England is J. H. Sankey and Son, Limited.

Sectional Floor Covering

POLYTHENE floor covering of an entirely new type for vehicles or buildings is being marketed in the United Kingdom and Eire by Rootes, Limited, Ladbroke Hall, Barby Road, London, W.10, and is available from all Rootes depots. Named Polymat, it is produced in squares



A Hough Payloader, sent out by the International Harvester works at Doncaster, dealing effectively with deep snowdrifts at Woodhead, Yorks, recently

of approximately 4 in. and each square has interlocking tabs and slots so that mats of any size can be made up quickly. For close fits, Polymat can be cut and shaped with a sharp knife. The material is pliable and extremely tough and is available in eight different colours. It is priced at 7d. per section, inclusive of purchase tax, and is obtainable in packages of six in any one colour.

Karrier Municipal Range Extended

FOUR new municipal vehicles have been added to the extensive range already established by the Rootes Group company, Karrier Motors, Limited. They are all new versions of the popular Bantam refuse collectors and comprise 10-cu. yd. side-loaders with single or double cabs on 10 ft. 2 in. and 11 ft. 5 in. wheelbases respectively, and 10-12 cu. yd. dual-tip collectors with single or double cabs on 8 ft. 2 in. and 10 ft. 2 in. wheelbases respectively. All four types have 27 by 6 tyres, front dampers as standard and strengthened front and rear springs and all have the choice of either petrol or diesel engine, full-forward control, four-speed synchromesh gearbox, fully floating rear axle, hydraulic two-leading-shoe brakes and an all-steel cab.

Argonarc Welding by Bonallack

FASTER methods of fabrication are constantly being sought by industry and a recent example of increased efficiency is the welding of light-alloy vehicle bodies by Bonallack and Sons, Limited. In the fabrication of aluminium bread vans, the firm is now using Argonarc equipment, supplied by British Oxygen Gases, Limited, for the welding of the main framework, interior

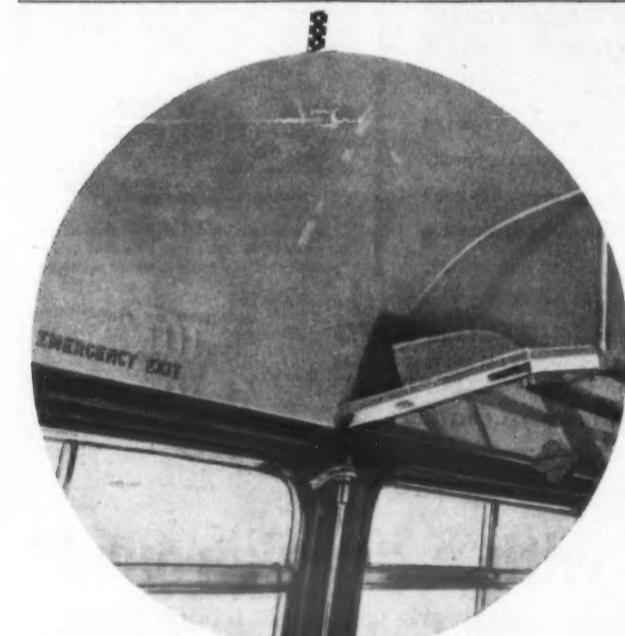


B.O.G. Argonarc welding plant in use on light-alloy vehicle bodywork at the Basildon works of Bonallack and Sons, Limited

racking and the cab structure instead of the solid riveting employed hitherto for this type of van. By employing welding, 80 gusset rivets formerly used in the construction of the main framework are no longer necessary and only one operator is required instead of two, except where squeeze riveting could be employed. On quantity runs the time taken for certain operations has been reduced by half.

Twin-Wheel Turbo Tractor

LATEST addition to the range of David Brown aircraft-towing tractors is a development of the well-known Turbo Taskmaster diesel machine, which has been supplied in quantity to the Royal Air Force, N.A.T.O. and Commonwealth air forces and to many aircraft manufacturers and civil airlines; the new tractor is basically a standard Turbo Taskmaster fitted with twin rear wheels and a more powerful 900-series 40-b.h.p. diesel engine, with six forward and two reverse speed gearbox giving road speeds of 2.3 to 22 m.p.h. at rated engine speeds. The twin-wheel machine weighs 9,000 lb., compared with 7,400 lb. of the standard tractor, and power-assisted steering is standard. It is designed to handle aircraft weighing up to 150,000 lb. under average airport conditions.



'Darvic' is also used on the underside of the luggage racks. Notice the reflections in the spotlessly clean 'Darvic' and the clearly printed notices.

'Darvic' p.v.c. sheet is used on the roof and undersides of the luggage racks in coaches made by Weymann's Limited for the North Western Road Car Co. Ltd.

DARVIC

'Darvic' is the registered trade mark for the rigid p.v.c. sheet made by I.C.I.



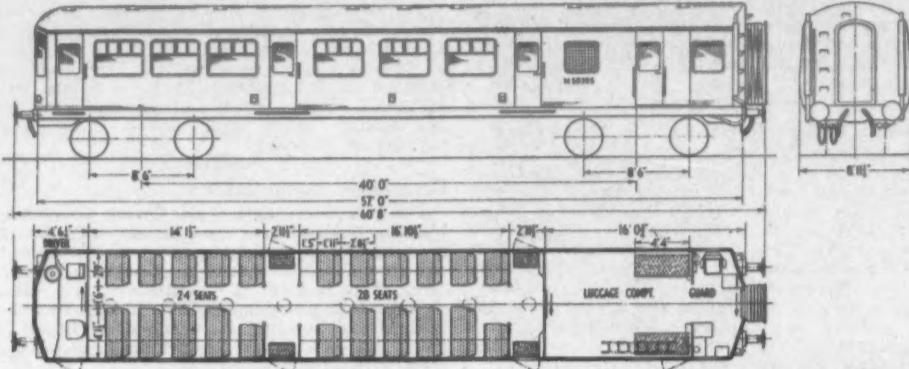
PARK ROYAL INTEGRAL RAILCARS

Multiple-Unit Diesel Design

FOR BRITISH RAILWAYS

UNDER the railway modernisation scheme, Park Royal Vehicles, Limited, has designed and is supplying to the British Transport Commission 40 multiple-unit diesel railcars of steel construction, utilising an integral layout of body and underframe. For suburban services, the cars are paired,

lished that the use of orthodox body and underframe construction would produce an unfavourable power-weight ratio, bearing in mind the nature of the projected operation of the cars and the resultant need for good acceleration. Accordingly, to achieve the required strength of structure with the neces-



General arrangement of the power car of the Park Royal set for British Railways

one power and one trailer car, but provision is made for through coupling of up to four pairs if required.

The power cars—seating 52 second-class passengers and having a 16-ft. luggage and guard's com-

PARK ROYAL TWIN-UNIT RAILCARS

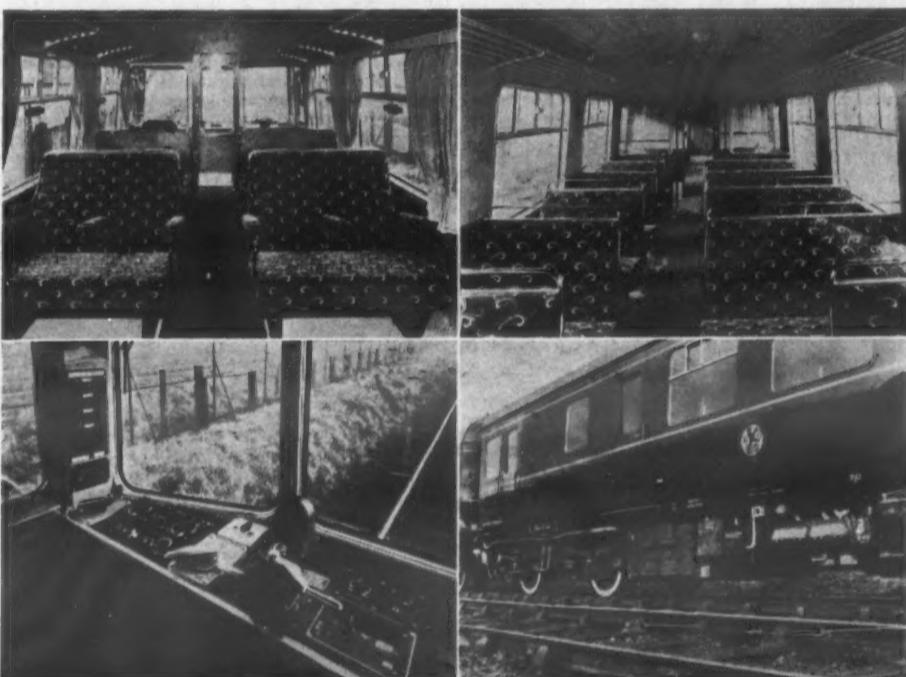
Length over headstocks	37 ft.
Bogie centre distance	49 ft.
Bogie wheelbase	8 ft. 6 in.
Overall height from rail	12 ft. 4½ in.
Overall width	9 ft.
Power car tare weight	33 tons 8 cwt.
Trailer car tare weight	26 tons 7 cwt.

partment—are powered by two B.U.T. "A" type horizontal underfloor-mounted 150-h.p. engines, each driving through a four-speed epicyclic gearbox to the inner axle of each bogie. The trailer car seats

sary weight reduction, an integral steel design was evolved for these Park Royal units. This is based on a frame—not self-supporting—having two 8 in. by 3 in. channel centre longitudinals threaded through folded channel transverse members which taper up to the Z-section rolled solebar. This is a patented feature.

Load Distribution

When body sides are erected an additional angle is welded full length of the solebar bringing it up to a depth of 15 in., with internal stiffening beneath each doorway opening. Drawgear and buffering loads are distributed throughout each end of the frame by diagonal members and plating, taking the main component of these loads to the bolster—a fabricated assembly based on two transverse members



First-class accommodation in the trailer car; view towards No. 2 end of the power car showing second-class seating; below, left, the driving controls and, right, No. 2 end of the power car showing the engine installation

48 second-class and 16 first-class passengers and is fitted with a toilet compartment. Both cars have a 4 ft. 6 in. driver's compartment.

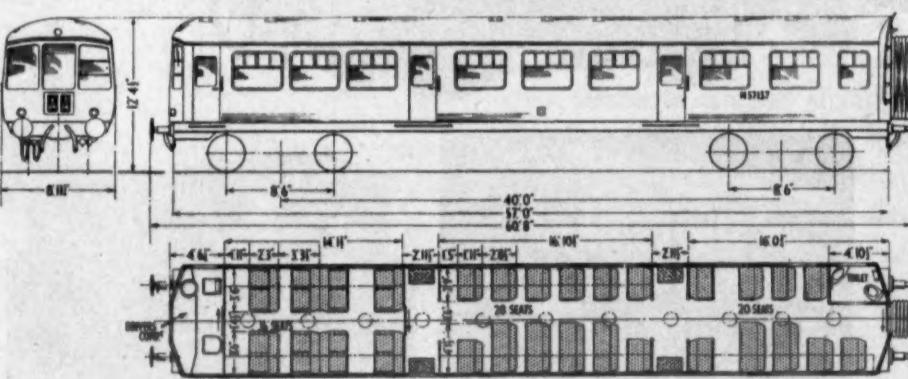
Electrical Equipment

Electrical installation in each car includes a Stones' generator and control gear—engine driven in the power car, axle driven in the trailer car—standard B.R. type B.R.A.2 batteries, and all services are fed from these. The main wiring, which includes all lighting, heating, control, fire alarm,

boxed. The complete frame is welded in one jig following setting up and the incorporation of the required camber. Jacks are inserted under the frames while under construction to prevent them taking up any set during erection.

Body Sides

The body side structure utilises top hat section pillars welded to the angle solebar extension member. These, together with top hat and Z-section longitudinal members, are jig welded in units before



General arrangement of the trailer car in the Park Royal twin unit

and charging circuits, is carried in trunking in the car floor, with conduit off-takes to each unit or group of units. The car heating system embodies two Smiths' combustion type heaters ducted to outlets throughout the saloons.

Power cars are fitted with two 22-in. vacuum brake cylinders; trailer cars carry two 18-in. cylinders. These are controlled by the Gresham and Craven quick-release brake system. Two engine-driven rotary exhaustors provide the necessary vacuum for brake application; two Westinghouse compressors supply the required air pressure for the engine, gearbox and final drive control units, and the air horns, etc.

During consideration of the design, it was estab-

lished that the use of orthodoxy body and underframe construction would produce an unfavourable power-weight ratio, bearing in mind the nature of the projected operation of the cars and the resultant need for good acceleration. Accordingly, to achieve the required strength of structure with the neces-

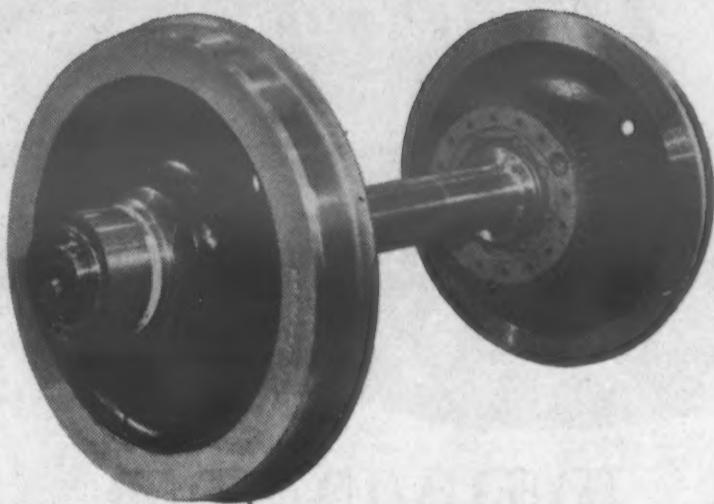
to achieve the necessary distribution of stress concentrations in the body side and underframe shown up on the stress diagram a deep cantilever was essential and this was achieved by the use of a 15-in. deep 10-gauge exterior cover panel in one piece, the full length of the body. This, combined with the double angle roof sticks and a connecting channel lower cant to pick up the pillars has resulted in a structure of great stiffness, particularly at the longi-

(Continued on page 10)

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ROtherham

YORKSHIRE

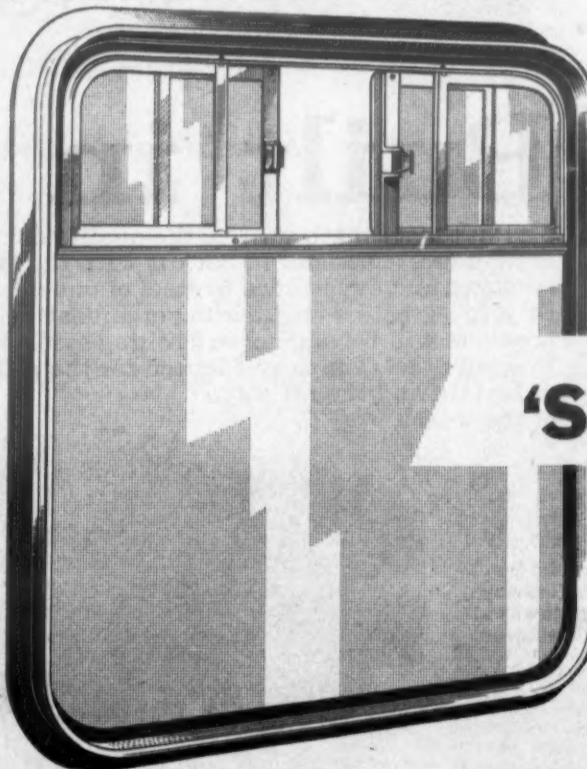


RAILWAY WHEELS AND AXLES

As one of the largest manufacturers of finished wheel and axle sets, Owen & Dyson not only contribute to an important degree towards the current modernisation schemes of British Railways, but are well known for the high quality and precision of their products supplied to railways in most parts of the world.

Owen & Dyson Limited supplied wheels and axles for the British Railways twin-unit railcars built by Park Royal Vehicles and now going into service.

Owen & Dyson Limited a subsidiary company of THE UNITED STEEL COMPANIES LTD



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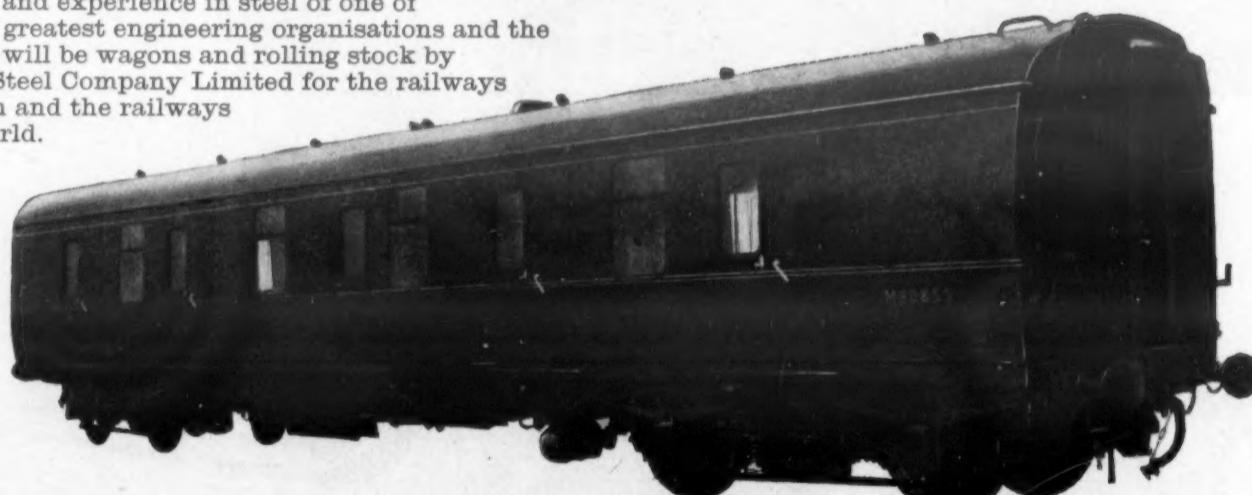
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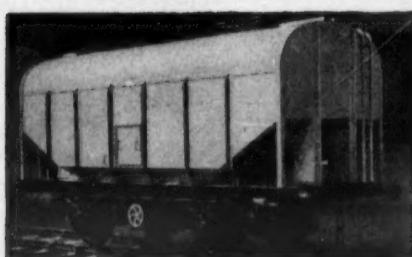
Built in strength

Add to the strength of steel the quality of British craftsmanship. Back it with the manufacturing facilities and experience in steel of one of Britain's greatest engineering organisations and the products will be wagons and rolling stock by Pressed Steel Company Limited for the railways of Britain and the railways of the world.

Latest addition to Pressed Steel Company Limited British Railways production: new 58 ft. gangwayed Standard Brakevan.


A 60,000 RECORD

British Railways have already taken delivery of over 60,000 16-ton all-steel mineral wagons produced in our Paisley works.



20-ton capacity Bulk Grain Van to the order of 16-ton mineral wagon to the order of British Railways.

Strength built-in by



PRESSED STEEL COMPANY LIMITED

RAILWAY DIVISION: Paisley, Scotland.
 HEAD OFFICE: COWLEY, OXFORD.

London Office: Sceptre House, 169 Regent Street, W.1.

More Tourists Even in January

Britain started the new tourist year well. Figures announced by the British Travel and Holidays Association show that there were 41,500 overseas visitors to this country in January, 7 per cent more than in the first month of 1957, when the figure was 38,800. Americans accounted for the greater part of the increase.

Extension of Leeds Headrow

The new 530-yd. long extension of the Headrow to join Westgate, in the centre of Leeds, was opened last week by Mr. G. R. H. Nugent, Joint Parliamentary Secretary, the Ministry of Transport. It completes a prewar improvement scheme to provide a spacious and gently curving east-west thoroughfare between St. Peter's Street and Wellington Street in place of narrow streets totalling more than one mile in length. The carriageway is 53 ft. wide.

County Offices Moved by B.R. Road Fleet

Commencing on March 31 the London Midland Region has been tackling one of its biggest road haulage jobs on record, moving the whole of the Derbyshire County Council headquarters offices from Derby to Matlock. The task will take five weeks and is being carried out by a fleet of four 6-8 ton motors and 20 trailers. They will run daily to a set timetable, including the Easter holiday, taking fully loaded trailers and containers to the new county offices at Matlock and bringing back empties to Derby for reloading. Loading and unloading is carried out by council staff.

More Rover Tickets Announced

Rover tickets, giving freedom of travel over the whole of the 4,000 route-miles of the London Midland Region, are available this summer from April 1 to October 31. The tickets, which can be used for a period of seven days, cost £6 second class or £16 for a man and wife. A child's ticket costs £4 10s. if travelling alone or £4 if travelling with parents. On the Western Region similar tickets will cost £13 10s. first class and £9 second class. When one and a half or more tickets are issued to one family the fare will be £12 first class and £8 second class. They are available for any day of the week.

Car Sleeper to Eastbourne

A new railway car-sleeper service will be introduced this summer between Glasgow St. Enoch and Eastbourne. It will operate from May 4 to September 27, on Sunday, Tuesday and Thursday from Glasgow, returning from Eastbourne on Monday, Wednesday and Saturday. The train will leave Glasgow St. Enoch Station at 7.45 p.m. and arrive at Eastbourne at 7.35 a.m. The return service will leave Eastbourne at 8.42 p.m., arriving at Glasgow St. Enoch at 9.38 a.m. Motorists using this service can enjoy the easy cross-Channel drive-on-drive-off car ferry facilities at Dover, Boulogne and Calais, and elsewhere. Bookings for cross-Channel journeys can be effected, it is stated, by prior arrangement through Glasgow St. Enoch car-sleeper reservation office or through the motoring organisations.

L.M.R. Motive Power Depot

Work has started on the construction of a new mechanical coaling plant at the London Midland Region Kirkby-in-Ashfield locomotive depot. It marks the first stage in a general modernisation scheme for the depot.

Leaving Space Between Heavy Vehicles

Meeting in Geneva, the E.C.E. working party on road safety at its last session recommended that heavy vehicles following one another in the open country should leave gaps of about 50-60 yd. between them.

Mechanised Railway Accounting

For preparation of accounts for the Chester and North Wales district of the London Midland Region a new mechanised central accounts office at Chester opened on April 1. Equipped with punched card accounting machines of the most up-to-date type, it is part of a scheme for mechanising goods and parcels accountancy throughout the region.

Democracy on the 8.30

The general manager of the Ceylon Government Railway has ordained that certain trains in the morning and in the afternoon for city workers to and from Colombo should be one-class. This is a result of an incident at Ganemulla Station, about 15 miles from Colombo, when third-class travellers blocked the line and disorganized all traffic for half a day as a protest against the inadequacy of third-class accommodation.

Scottish Rail Tour

The Scottish area of the Stephenson Locomotive Society has arranged a rail visit on May 3 to cover the Aberfoyle and Kilsyth branches, closed to passengers in 1951. The special train will leave Glasgow Queen Street High Level at 1.10 p.m. for Kilsyth terminus via Kirkintilloch. Returning to Kelvin Valley Junction, the 25-mile single-track Aberfoyle line will then be traversed. Returning to Glasgow, the former City Union line from Springburn will be used to reach St. Enoch Station at 8.50 p.m. Tickets will cost 16s. and can be obtained from Mr. W. A. C. Smith, 46 St. Andrew's Drive, Glasgow, S.1. An itinerary costs 2s. 6d.

Shunting Tractors in Rail Yard

Substantial reductions in operating costs and improved service for customers are being achieved by the Victorian Railways in Australia through the use of tractors for shunting in goods yards. By replacing locomotives for shunting trucks in sidings and other railway yards, operating costs have been considerably cut. Minimum savings at the Melbourne suburban goods yard at Footscray alone are estimated at £15,000 per annum. Tractors have provided improved service by reducing delays to goods trains through cutting down shunting at roadside stations; and being able to place trucks in sidings at the time most convenient to customers who might otherwise have had to wait for a locomotive to become available. It is claimed that this better service has already regained £5,000 worth of traffic yearly from road transport.

Strength built-in by

RAILWAY DIVISION: Paisley, Scotland.

HEAD OFFICE: COWLEY, OXFORD.

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COMMERCIAL AVIATION

Australian Government Says "No"

AER LINGUS CHARTERS

TWO major internal airlines in Australia have been refused Government permission to buy new United States and French air liners, and have been asked to buy Vickers Viscount Series 800 turboprops instead. They are the privately owned Ansett-Australian National Airways, which had ordered four Lockheed Electra turboprops, subject to dollar availability, and the Government-owned Trans-Australia Airlines, which wanted two French Caravelle jets. There have been reports that Ansett-A.N.A. has already ordered four Viscount 800s, to be delivered in about a year. Senator Shane Paltridge, Minister of Civil Aviation, said the Cabinet decision had been made after a detailed financial and technical survey. The Australian air transport industry had been passing through a "grave economic crisis" and it still had a very marginal rate of profit. Other factors included the slower rate of traffic growth, in which Viscounts could be more profitably operated than the two new types and the urgent need for a period of stability which could not be achieved by pioneering Electra and Caravelle operations. Introduction of these new types on short-range routes would add substantially to the overall cost of national transport, and their purchase would stimulate a competitive race for other new turbine types which could be disastrous to economic stability.

B.E.A. Signs Comet Contract

Lord Douglas of Kirtleside, chairman of British European Airways, last week signed a contract for six de Havilland Comet 4Bs powered by Rolls-Royce Avon engines. Mr. A. F. Burke, managing director of the de Havilland Aircraft Co., Limited, and Mr. A. S. Kennedy, financial director of the company, signed the contract on behalf of the manufacturer. The contract, with spares, is worth about £7 million. Deliveries are due to begin early in 1960 and B.E.A.'s first jet service will be inaugurated later that year.

Aer Lingus Has to Charter

Since the three Aer Lingus Viscount 707s which are being modified in England may not be returned to Dublin before Easter and because of the big Easter traffic, and the many charter flights to Lourdes for the centenary year, Aer Lingus had decided to hire Viscounts. At the end of January Vickers-Armstrongs, Limited, recommended the immediate carrying out of modifications to the early Viscounts operated by B.E.A., Aer Lingus and Air France. Aer Lingus had earlier decided to have the work done, and when the announcement was made one of its Viscounts was having the modified spar fitted. This machine, with the three newer Viscount 808s, has hitherto been able to cope with all the normal Viscount flights, but these aircraft and the 11 DC-3s would not be able to cope with all the Easter traffic and Lourdes charter services. Vickers is hiring two Viscount 745s to Aer Lingus and the airline has arranged with three British independent airlines—Hunting-Clan, Airwork and Transair—to operate some of its London-Dublin services with their Viscounts. The 745s are being modified to seat 53 passengers and, in view of their different equipment, crews will have to be trained in them before they enter service.

I.A.T.A. Clearing Turnover

More than £1,000,000,000—or \$2,800,000,000—in international airline business has been settled through the I.A.T.A. Clearing House in London during its first 11 years operation. The clearing house, which settles accounts between the airlines in both dollars and sterling, passed the £1,000,000,000 mark in two-way clearances during the final quarter of 1957. Total turnover for the year it has been announced by the International Air Transport Association amounted to \$639,249,000—an increase of 30 per cent over the 1956 total of \$492,680,000. Offsetting of credit against debit accounts eliminated the necessity for cash payment of 88.9 per cent of all transactions cleared during the year. The number using I.A.T.A. clearing facilities during the year increased from 77 to 85. This included both I.A.T.A. members and 20 U.S. domestic airlines served by interclearance arrangements with the Airlines Clearing House (A.C.H.), in the United States. Interclearances with A.C.H. totalled \$26,598,000 for the year, or 32 per cent above the 1956 total of \$20,130,000. The cost to members of the services of the clearing house was 16 cents per \$1,000 of gross receivables or approximately 3½d. per £100 of sterling claims.

B.E.A. Turboprop Plans Progress

Plans of British European Airways for an all-turboprop fleet of air liners on its international routes will near completion this summer. Lord Douglas of Kirtleside, chairman of the corporation, writes in the latest issue of the *B.E.A. Magazine*: "During the summer we expect to retire the remainder of our Elizabethan fleet from service. This means that almost all B.E.A.'s international passenger operations will be entrusted to turboprop Viscounts after about midsummer. In fact, the only exceptions will be our local Gibraltar operations and London-Salzburg where runway restrictions still make it necessary to use Pionairs. The achievement this summer of an almost all-turboprop operation on B.E.A. international network is a notable landmark. It gives added point to another important activity with which B.E.A. will be concerned during the coming months. This is the development flying of the new Rolls-Royce propeller-turbine engine, the 4,500-h.p. Tyne, of the type which is to power the 20 Vickers Vanguard which are to be delivered to B.E.A. from the spring of 1960. Before the Elizabethans finally left, one of them had yet to do a vital job by acting as a flying test-bed for the Vanguard's power unit alongside the second prototype Elizabethan which was also to be used for Tyne development. The two Elizabethans G-ALZR and G-AKRD would be flown by B.E.A. crews during an intensive 10-month flying programme, in which some 2,000 hr. of airline operating conditions would be simulated. A Lincoln bomber fitted with a Tyne engine had already been flying since 1956. The simulated airline flying programme, plus the flying on the Elizabethan prototype and on the Lincoln test-bed, and test and development flying of the first Vanguards, was planned to provide a total of about 10,000 engine flying hours on the Tyne—in 3½ years—before the Vanguard entered airline service in 1960. On the corporation's results the chairman said: "B.E.A. will, I believe, achieve its largest profit yet for the financial year ending on March 31, 1958, but this will be in spite of, rather than because of, our results this winter. Our losses during these winter months are continuing to be abnormally high."

TRANSPORT IN ALL ITS ASPECTS



Mr. ERNEST G. WHITAKER, M.Inst.T.

E. G. Whitaker

Since January of this year Mr. Ernest Gillett Whitaker has been transport adviser to the board of Unilever, Limited, having for the previous four years been deputy transport adviser. Born in 1903 he was, when 16, apprenticed to motor engineering and then, at the age of 21, he started his own business as haulier and motor repairer. Subsequently joining the Gupwell group of companies, he became a director thereof in May, 1936. Nearly four years later he joined the staff of the Ministry of Food and served as an area and livestock forwarding officer until December, 1940, when he was transferred to headquarters as an assistant director of transport. In January, 1947, Mr. Whitaker took up an appointment with Unilever, Limited, and resigned his directorships in the Gupwell group, including that of A. J. Gupwell (Transport), Limited. In October of the same year he was made chairman of the General Freight Co., Limited, a Unilever company engaged on cargo superintendence and, as already indicated, at the beginning of 1954 he became deputy transport adviser under Mr. A. G. Marsden, whom he has now succeeded. In February of that year he joined the board of S.P.D., Limited, the Unilever associate concerned with warehousing and distribution; he later became chairman of that company. He served as a member of council of Associated Road Operators from its inception as the Long Distance Road Haulage Association and was also a member of council of the Commercial Motor Users Association. At the outbreak of war in 1939 he was a member of the Road Haulage Central Wages Board and joint chairman of the Midland region of the Road and Rail Central Conference. Mr. Whitaker is a member of council of the Institute of Transport; he is a founder member of the Institute of Materials Handling, and served for its first two years as deputy chairman. He has been closely concerned with transport in all its applications throughout the world and is a member of the Central Transport Consultative Committee, the Traders Co-ordinating Committee on Transport, and the Channel Tunnel Study Group.

IN PARLIAMENT

Letter to B.T.C. on Advances

BLACKWALL TUNNEL SCHEME

AT the request of MR. ERNEST DAVIES, the Minister of Transport has published the letter which he sent to the B.T.C. on October 22 last regarding advances to meet railway deficits. This was the letter referred to on the day that the London bus wage award was announced and the eve of the hearing of the railway wage claim:

Letter from the Minister of Transport and Civil Aviation to the Deputy Chairman of the British Transport Commission
October 22, 1957

I wrote to your chairman on September 29 about some of the measures the Government had decided must be taken to curb inflation and support the value of the pound sterling. In that letter I explained that the aim for the public sector was to keep the level of investment expenditure over the next two years within the level attained this year and I gave the amounts within which the Commission would be expected to keep their actual expenditure on investment in 1958 and 1959.

The same considerations must apply to the advances made to the Commission under the provisions of the Transport (Railways) Act, 1950, to meet deficits arising in account of British Railways, and therefore let me know in good time that it has been decided that for 1958 and 1959 no advance will be made to the Commission above the level contemplated in the White Paper. For 1958, therefore, the amount will not be in excess of the actual ascertained deficit for 1957 as certified by the auditors in due course. For 1959 the advance will be reduced in accordance with the forecast on which the White Paper is based. I thought that the Commission would wish to know exactly how they stand over the next two years, in the light of the Government's present financial policy, under the provisions of the Act.

(Signed) HAROLD WATKINSON

Blackwall Tunnel Scheme to Go Ahead

The Minister of Transport announced that he had informed London County Council that he was prepared to consider a scheme for the duplication of Blackwall Tunnel. It would, he hoped, be possible to begin work as soon as detailed plans and estimates had been considered and approved. He had asked the L.C.C. to expedite the work.

Extension of Tests to Heavy Vehicles

Heavy goods vehicles were generally better maintained than light goods vehicles, and they were already liable to inspection under the provisions of the Road and Rail Traffic Act, 1933. It was for those reasons that they were excluded from the present compulsory testing plan, said the Minister of Transport. But when the scheme was successfully under way he was going to consider extending it to other classes of vehicles.

G-Rating of Aircraft Seats

MR. R. GRESHAM COOKE asked the Minister of Transport and Civil Aviation to ask the Air Registration Board to consider the desirability of civilian air liners having seats constructed to stand 15g instead of 9g as at present, in the interests of safety. MR. H. WATKINSON: Present evidence indicates that no worthwhile gain in safety would result from increasing the strength of seats beyond 9g. The Air Registration Board agrees with this view.

Tests for Steam Traction Engines

MR. G. R. CHETWYND asked the Minister of Transport whether he would include road steam traction engines in the regulations for vehicle tests on the same basis as veteran-type cars and motor cycles. MR. G. R. H. NUGENT said it was intended to limit the tests initially to motor cycles, private cars and goods vehicles not exceeding 30 cwt. unladen weight, but the suggestion would be included if and when the scheme is extended to cover heavier types of vehicles. Mr. Chetwynd said it would be a pity if traction engines were excluded from rallies while veteran cars were allowed in.

Port Charges on Exports to Europe

Some British exporters of goods in bulk found that they were, in present circumstances, obliged to pay higher handling charges in British ports for their export goods and chartered ships than their German competitors in German ports. In view of the approach of European Free Trade, an investigation should be made into the matter with a view to ensuring that British exporters were not handicapped on this account, suggested MR. R. GRESHAM COOKE. MR. H. WATKINSON said conditions varied from port to port and it was difficult to make comparisons between them, but the evidence suggested that the general position of exporters in a Free Trade Area was unlikely to be prejudiced by difficulties on this account.

DELTIC DIESEL-ELECTRIC LOCOMOTIVES

B.T.C. Order for 22

IT is announced by the British Transport Commission that an order is being placed with the English Electric Co., Limited, for 22 Deltic diesel-electric locomotives of 3,300 h.p. for use on express passenger services on the East Coast main line. The order follows extensive trials of a prototype, the most powerful yet built in Britain, since November, 1955. Deliveries will begin in 1960, and it is expected that by mid-1961 all the 22 diesel-electric locomotives now ordered—in replacement of 55 main-line steam locomotives—will be in use on such trains as the Flying Scotsman, the Elizabethan, the Talisman, the Yorkshire Pullman, and the Tees-Tyne Pullman. Allocation will be eight to Kings Cross (Great Northern Line, Eastern Region), six to Newcastle (North Eastern Region) and eight to Edinburgh (Scottish Region).

The locomotives now being ordered will be built at the works of Vulcan Foundry, Limited, Newton-le-Willows, with diesel engines to be supplied by the Napier factory in Liverpool; electrical equipment will be made at Preston. The Deltic is geared for a maximum speed of 105 m.p.h.

FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

G. D. Peters

G. D. Peters, Limited, is paying 10 per cent (71 per cent) for the year ended December 28, 1957. Net profit was £124,988 (£79,391) after tax £128,000 (£85,500).

Calcutta Tramways

The board of the Calcutta Tramways Co., Limited, has deferred the question of an interim ordinary dividend for 1957 pending a decision by the Government of West Bengal on the report of the independent inquiry commission on conversion to rupee basis (the new currency) and the fare structure of public transport in Calcutta.

CLASSIFIED ADVERTISEMENTS

RATES.—The minimum charge for classified advertisements is 7s. for 14 words or less, and 6d. for each additional word. The name and address of the advertiser is charged at the same rate. If a box number is used 2s. extra is charged to cover our name and address and postage. If set in paragraph form each paragraph is estimated separately. Official Notices and semi-display in the classified columns are charged at the rate of 4s. per single column inch.

CLASSIFIED ADVERTISEMENTS should be addressed to THE MANAGER, Classified Advertisements, MODERN TRANSPORT, Russell Court, 3-16 Woburn Place, London, W.C.1.

ACCEPTANCE.—Advertisements can be accepted up to 2.30 p.m. on Monday to ensure insertion in the current week's issue. MODERN TRANSPORT is on Sale every Friday.

SITUATIONS VACANT

SHIPWORLERS' national organisation requires a male assistant to the Executive Staff aged 22/25 years; experience of shipping, port facilities and committee work an advantage. Commencing salary £900/- (pensionable) according to age and experience. Applications, giving details of education and experience, should be addressed to the Secretary, Chamber of Shipping of the United Kingdom, 3/6 Bury Court, London, E.C.3.

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has a vacancy in London office for a

TRANSPORT EXECUTIVE

A man is required with drive, enthusiasm and practical experience in the distribution of products by rail, road and sea. In particular thorough familiarity with rail transport and rail charges is essential. Age preferably not over 40. Experience in the bulk transport of chemical products would be an advantage. Salary according to age, qualifications and experience. Staff Pension Scheme, etc.

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STUDENT, preparing for graduation examination of Institute of Transport, seeks a junior position in any capacity. Apply Box No. 3788, MODERN TRANSPORT, 3-16 Woburn Place, London, W.C.1.

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GUARANTEED hardware Chamois Leathers. Approximately 22 in. by 16 in.: only 6s. 11d. each (minimum order six); 1 kip (30) less 5 per cent.—County Chamois Co. Limited, Rocky Lane, Aston Cross, Birmingham.

OFFICIAL NOTICE

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APPOINTMENT OF ASSISTANT TRAFFIC SUPERINTENDENT

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S. JOBLING, M.Inst.T.
General Manager.

Oak Lane,
West Bromwich.

Park Royal Integral Railcars

(Continued from page 7)

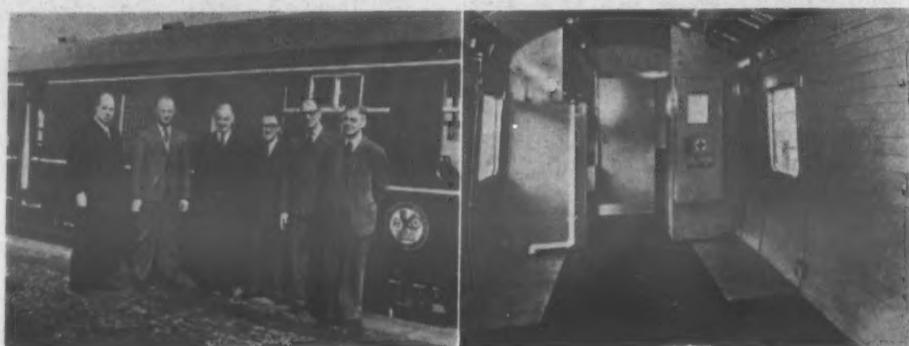
tudinal stress concentrations. During static load testing a maximum deflection on the frame line of $\frac{1}{8}$ in. was recorded with 200 per cent overload, with consistent return to zero on unloading.

Erection Method

The main body side units are mounted to the set-

throughout its length with the necessary camber, and only when the complete shell is assembled is the unit self-supporting.

The bogie design follows the B.R. standard steel design for diesel cars, but utilising folded steel sections in place of rolled members. Standard B.R. pattern 3 ft. diameter wheels and axles are used



On the recent demonstration run of the new railcar set were (left to right) Messrs. R. G. Gregg (sales manager, Park Royal Vehicles), J. W. Shirley (general manager, Park Royal Vehicles), H. Randle (carriage and wagon engineer, Derby, L.M.R.), A. C. Needs (chief engineer, Park Royal Vehicles), S. Hollands (general manager, Crossley Motors), and Eling Smith (assistant to carriage and wagon engineer, Derby, L.M.R.); right, the guard's van is at No. 2 end of the power car

with S.K.F. axleboxes, and the brake blocks, carriers, etc., are standard B.R. pattern, for ease of replacement.

Interior Decor

The interior scheme of the cars is very attractively carried out in leathercloth-lined side panels, Laconite ceiling panels and matching moquette upholstery. The vestibules are formed by glazed partitions trimmed to match the saloon. The second-class seating is of the low back type to give good visibility and an open car; it is trimmed in a maroon and grey scheme, while the first-class saloon

PARK ROYAL RAILCAR SUB-CONTRACTORS

Engines, running and control gear	British United Traction, Limited
Underframe and bogie frames	John Thompson Motor Pressings, Limited
Vacuum brake equipment	Gresham and Craven, Limited
Axleboxes	Skefko Ball Bearing Co., Limited
Wheels and axles	Owen and Dyson, Limited
Laminated springs	Willford and Co., Limited
Coil springs	Turton Brothers and Matthews, Limited
Electrical equipment	J. Stone and Co. (Deptford), Limited
Insulation and asbestos	J. W. Roberts, Limited
Anti-friction materials	Laycock Engineering Co., Limited
Main windows	Hallam, Sleigh and Cheston, Limited
Drop windows and door gear	Beckett, Laycock and Watkinson, Limited
Seat frames and luggage racks	Deans and Son (Yorkshire), Limited
Speedometer	Smiths Industrial Instruments, Limited

—separated from the remainder of the car by a sliding door—is trimmed in blue and grey, with a luxurious type of sett with frame by Deans and Son (Yorkshire), Limited.

The driver's desk, with orthodox control layout, is faced with black Formica and the deepest possible screens give maximum visibility to the driver and passengers. Travelling in these railcars, as with their predecessors in the Park Royal tradition on the G.W.R., in Ireland and elsewhere, will certainly be attractive to the public in the areas to which they are allocated.

LAMPS AND LIGHTING EQUIPMENT

Summer Exhibition

An exhibition of lamps and lighting equipment has been opened at the Mazda Showroom, Crown House, Aldwych, by A.E.I. Lamp and Lighting Co., Limited, to serve as a ready reference to all its ranges of lighting equipment, with the exception of streetlighting. This display will remain open through the summer months. Flexibility, the theme of the display, is demonstrated in the fluorescent, commercial and industrial ranges, in the range of A.E.I. fluorescent module fittings for use in recessed ceilings, and by the three A.E.I. systems of lighting trunking—Invertrunking, Shallow and Universal.

Interchangeability

A large range of fluorescent fittings is shown mounted at well-spaced intervals on the permanent installation of Invertrunking in the showroom to show each fitting individually and to allow visitors to make their own assessments of its appearance in use. A special section is devoted to the method by which the associated range of fluorescent, industrial and commercial fittings is assembled on a basic power pack with interchangeable additional parts. Visitors are able to examine a fitting mounted at a convenient height to enable them to change components such as diffusers and reflectors.

Double-sided island stands in the middle of the showroom are devoted to displays of the complete range of A.E.I. Satina glass shade fittings shown as single shade fittings and a selection of 25 fittings from the shop and display lighting range. They also incorporate fluorescent lamp colour cabinets showing the colour appearance of the standard Mazda fluorescent coloured lamps and the colour appearance and colour rendering of the Mazda range of five "white" fluorescent lamps.

Industrial to Floodlighting

Industrial tungsten and mercury vapour reflector fittings are shown in a separate section, together with a selection of six A.E.I. floodlight fittings chosen to cover nearly every floodlighting application and a complete range of gripper handlamps. Commercial glassware fittings are shown in many different shapes, including the well-known "brandy glass," "acorn" and spherical fittings.

The exhibition was designed by Robert Wetmore, M.S.I.A., in conjunction with the exhibition section of the A.E.I. Lamp and Lighting Company publicity department; the display was constructed by Window Arts, Limited.



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FORD MOTOR COMPANY LIMITED - DAGENHAM

COMMERCIAL VEHICLE TEST

Austin-B.M.C. 7-ton Dropside Lorry*

POWER STEERING MAKES FOR BETTER DRIVING

WITH many other people, editorially, we have been inclined to the view that power-assisted steering is an unnecessary luxury and an unwarranted complication on a vehicle designed for normal road use, while conceding that a case could be made out for its use on special-purpose and off-road vehicles and perhaps on high-capacity urban buses working for long periods in congested city streets. In the past, we argued, vehicles had always been designed, and they were still being designed, with entirely acceptable steering without this added cost and complication. We could understand the offer of power steering as an optional extra, for there are some customers, even hard-headed road vehicle operators, who cannot resist gadgetry, and it is good business to give the customer what he wants when he is willing to pay for it; but if a manufacturer decided to fit a steering servo as standard, was it perhaps to cloak some defect in steering design?

Having tested two normal haulage vehicles which fit power-assisted steering as standard recently—the Thornycroft Trusty eight-wheeler in November, 1957, and the Austin-B.M.C. 7-tonner last month—we hasten to recant and to confess that if we were buying a lorry of about 6 tons capacity or over, we should specify power steering and we should probably buy from a firm that fitted it as standard as being the more experienced in its application. When applied as the two manufacturers mentioned have developed it in their respective production vehicles, we are now convinced that it is an aid to better driving. Commercial vehicle laden weights have steadily increased over recent years and larger-section lower-pressure tyres have tended to dictate the use of

fitted with a gear-driven Hydrosteer eccentric rotor-type oil pump to provide power for the Hydrosteer servo. An excellent job of integration with the cam-type gear provides sensitive steering with a helpful self-centring action and the lightness more usually looked for in the small family saloon. To assess the effects on the steering of a fault developing in the servo or a stalled engine while coasting, the engine was stopped while the vehicle was coasted for several hundred yards on a downgrade. Steering was naturally much heavier but the vehicle remained steerable right down to a crawling speed without undue effort on the wheel being called for.

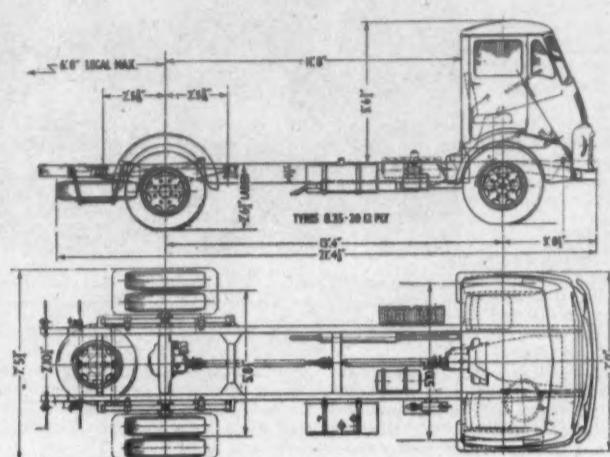
Well-Established Vehicle

The Austin-B.M.C. 7-tonner is now well established in the medium-capacity road haulage field

and is available with wheelbase measurements of 13 ft. 4 in. and 12 ft. 6 in. for standard platform and drop-side lorry and specialist or van bodywork, and 10 ft. for tipping bodies or as an articulated tractor. All are available with right- or left-hand control and in completely knocked-down form, when required, for export. The long-wheelbase chassis provides for a maximum legal body length of 18 ft. 4 in.; the works-built dropside

lorry has a platform length of 17 ft. 9 in., which involves the use of an optional 14-in. rear chassis frame extension. The dry weight of this chassis, with cab, is 2 tons 19*1*/₂ cwt., with corresponding reductions for the shorter versions, and the range is designed for a maximum laden weight solo of 10 tons 5 cwt. and up to 17 tons as a tractor-trailer combination.

The standard power unit is the B.M.C. OEB 2S diesel engine, with Simms fuel-injection equipment



Drawings showing principal dimensions of the Austin-B.M.C. 7-ton l.w.b. chassis

TEST RESULTS AT A GLANCE

Vehicle Details

MAKER: Austin Motor Co., Limited, Longbridge, Birmingham.
TYPE: Austin-B.M.C. 7-ton dropside lorry.

ENGINE: B.M.C. Type OEB six-cylinder direct-injection diesel; bore 3.74 in. (95 mm.), stroke 4.725 in. (120 mm.), capacity 311.5 cu. in. (5.1 litres); compression ratio 16.5 to 1, 105 b.h.p. at 2,600 r.p.m., 232 lb./ft. torque at 1,750 r.p.m.

TRANSMISSION: Clutch, 12-in. Borg and Beck single dryplate, 138 sq. in. (890.3 sq. cm.) lining area; gearbox, four-speed, constant mesh second and third, ratios 6.061, 3.473, 1.746 and 1 to 2 forward, 6.051 to 1 reverse; driveshaft, two-piece balanced open shaft with Hardy Spicer needle roller bearing joints and large centre bearing; rear axle, Eaton 16500 series two-speed spiral bevel with fully floating shafts, ratios 6.14 and 8.54 to 1.

BRAKES: Hydraulically operated vacuum assisted two-leading-shoe, 16 in. (404 m.) dia. front and 15*1*/₂ in. (385 m.) dia. rear; total lining area 480 sq. in. (10.310 sq. m.); handbrake mechanically linked to rear wheels only.

TYRES: 8.25-20 12-ply standard; 9.00-20 12-ply optional extra.

WHEELBASE: 13 ft. 4 in. (4.06 m.); alternatives 12 ft. 6 in. (3.81 m.) and 10 ft. (3.04 m.).

WEIGHT: 1.w.b. dropside lorry in licensing order 3 tons 10*1*/₂ cwt. (3,577 kg.); in kerb trim 3 tons 13 cwt. (3,708 kg.).

PRICE: Chassis—scutte only £1,273, dropside lorry complete in primer £1,525. British purchase tax in each case £304 15s. 3d.

lower-gear steering and larger steering wheels to provide the necessary turning moment at low speeds. Frequently, now, speed on sharp corners and bends and in manoeuvring is limited by the driver's ability to wind on the necessary lock rather than by power, stability or safety considerations.

Efficiency and Safety

With a properly developed power-assisted steering, advantage can be made of a higher steering

Test Results

ROUTE: MODERN TRANSPORT route in Kent and Surrey with London addition.
CONDITIONS: Rather cold with steady rain all day.

RUNNING WEIGHT: 10 tons 13 cwt. (10,820 kg.) plus crew of two.

PAYOUT: 7 tons (7,112 kg.).

FUEL CONSUMPTION: For 15 miles continuous running in fairly heavy traffic (15.2 m.p.g. (5.4 km./litre) at 27 m.p.h. (43 k.p.h.) average speed).

GROSS TON/M.P.G.: 164.2 (90.1 tonnes/km./litre).

LOAD TON/M.P.G.: 106.4 (59.3 tonnes/km./litre).

MAXIMUM GRADIENT CLIMBED: 1 in 4*1*/₂ (21 per cent).

TURNING CIRCLE: Wheeltrack 39 ft. (33.9 m.), sweep 61 ft. (55.8 m.).

ADJUSTMENTS DURING TEST: None.

ACCELERATION: Averages of four runs through gears, low axle ratio:

0-20 m.p.h. 11.1 sec.

0-30 m.p.h. 27.7 sec.

in direct drive, low axle ratio:

10-20 m.p.h. 11.8 sec.

10-30 m.p.h. 27.6 sec.

Braking: Average emergency stopping distance on wet tarmac 57 ft., equivalent to 16 ft. per sec. per sec. or 0.53 g. average retardation. Tapley meter readings 70.75 per cent. Handbrake only, 32.33 per cent Tapley meter.

ESTIMATED TOP SPEED: About 50 m.p.h. (80 k.p.h.).

OVERALL FUEL CONSUMPTION: For 15 miles fully laden, including 25 miles in London and suburbs, numerous stops and all tests, 12 m.p.g. (42.5 km. per 100 litres).

and built-in Hydrosteer pump, but the OEB 2C with C.A.V. injection pump, is available alternatively. The engine has a bore of 3.74 in. and stroke of 4.725 in., giving a displacement of 311.5 cu. in. (5.1 litres) and with a compression ratio of 16*1*/₂ to 1 is set to give maxima of 105 b.h.p. at 2,600 r.p.m. and 232 lb./ft. torque at 1,750 r.p.m. A seven-main-bearing counterbalanced crankshaft incorporates a torsional vibration damper and all main crankshaft bearings are of the copper lead-lined



Rain fell steadily throughout the tests but even on wet tarmac, average overall stopping distance from 30 m.p.h. was 57 ft. In the picture on the right, the chalk-firing magazine designed by the Road Research Laboratory, which measures stopping distance accurately, can be seen clamped to the nearside front wing.

gear ratio to provide improved average speeds and economy. For example, speed of a loaded vehicle without steering servo through a well-aligned open roundabout might have to be reduced to, say, 10 m.p.h.—well below the vehicle stability limits and necessitating a change down to second gear. With power steering it could well be taken perfectly safely at double the speed and one or two gears higher. Manoeuvring in restricted places is made easier and safer; changes of lock can be made quickly and with little effort, with one hand if necessary in reversing, enabling the driver to devote all his attention to matters outside the cab. Finally, there is the reduction in general driver fatigue, which is not measurable but assumes ever greater importance as roads become more congested and driving conditions more difficult.

All these points were noted and marked favourably during our road test of the Austin 7-ton dropside lorry powered by the B.M.C. 5.1-litre direct-injection diesel engine, which in this application is

steel-shell replaceable type. Toroidal cavities in the piston crowns form the combustion chambers and inlet valves are masked to promote air swirl. The five-ring light-alloy pistons operate in replaceable wet-type cylinder liners.

The seven-bearing camshaft and injection pump are driven by triple roller chain and the injection pump incorporates a pneumatic governor. Injection nozzles of the four-hole spray type are used.

The cooling system employs a belt-driven centrifugal pump and is thermostatically controlled and the lubrication and fuel systems are protected by cartridge-type filters. There is an oil-bath cleaner on the air intake. The 12-volt electrical system has an earth-return dynamo as standard but an insulated-return unit is available optionally for operation in countries where two-pole wiring is obligatory.

A 12-in. diameter Borg and Beck single dryplate clutch carries the drive to a four-speed gearbox with constant-mesh gears (except first and reverse)

(Continued on page 12)

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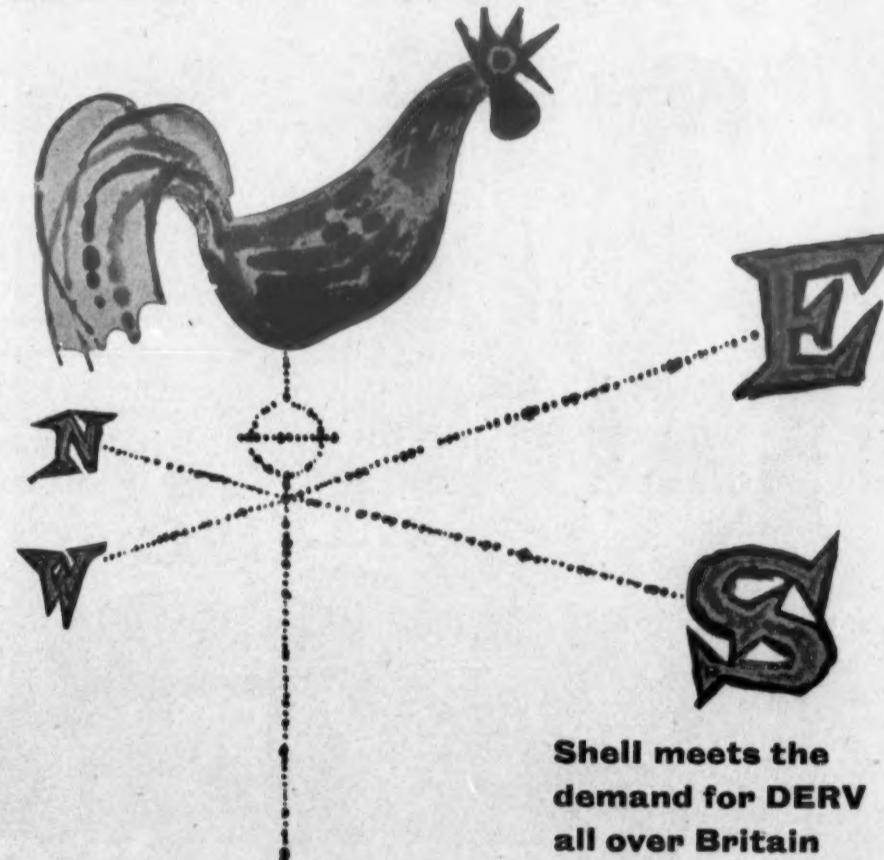
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YOU CAN BE SURE OF SHELL D.E.R.V.

Austin 7-tonner On Test

(Continued from page 11)

and there is provision on the casing for a tyre pump and power take-off. A balanced two-piece tubular propeller shaft incorporates Hardy Spicer needle roller bearing universal joints and a flexible centre-bearing housing. The standard axle is an Eaton 16500 two-speed unit employing spiral bevel gears and fully floating half shafts, with ratios of 6.14 and 8.54 to 1 and electrically operated gearchange.

9-in. Frame

The heavy-gauge pressed-steel frame, with five crossmembers and a maximum sidemember depth of $9\frac{1}{2}$ in., is suspended on semi-elliptic springs 45 in. long by $2\frac{1}{2}$ in. at the front and 60 in. by $2\frac{1}{2}$ in. at the rear. Hydraulic dampers are available at extra cost. Hydraulically operated two-leading-shoe brakes are vacuum assisted and provide a total lining area of 480 sq. in., giving a specific area normally laden of 47.7 sq. in. per ton. For a gross vehicle weight of 10 $\frac{1}{2}$ tons, 8.25-20 12-ply tyres, with twins at the rear, are fitted as standard, while 9.00-20 12-ply tyres are available at extra cost for operation at 11 tons gross. Standard equipment includes spare wheel and tyre, two driving mirrors and two windscreen wipers and built-in radio and single- or twin-unit heater-demister are offered as optional extras.

The standard B.M.C. forward-control welded steel cab provides convenience and comfort for the driver and mate, with two-way adjustable driver's seat, a divided windscreen, both panels of which can be opened, and swivelling quarter lights and balanced full-drop windows on both sides. We found the seating firm but comfortable, the view satisfactory in all directions and the controls and instruments well placed. Although the B.M.C. diesel is not basically more noisy than contemporary engines, noise level in the cab we found rather high and thought that some form of noise-insulating treatment on the inner sides of the engine cowling might be used with advantage.

Performance-wise, the engine is quite remarkable, providing a sensibly flat torque curve above the 230-lb./ft. line between about 1,250 and 2,100

r.p.m. Engine speed is now governed at 2,600 r.p.m., 2,000 r.p.m. higher than earlier versions of this unit, giving a maximum b.h.p. of 105. This widened engine speed range is allied to well-chosen gearbox ratios that fit in with the standard two-speed axle to provide eight reasonably evenly graded forward ratios. Smooth and comfortable fully laden starts on fairly level road could be made in low second and the positive electrical axle gear-change was found to make fast split changes feasible, providing an ability to keep the engine running within its most efficient range on gradients.

Practical observations of performance were made in the usual way with stopwatches on a straight



In a rural setting near Sheffield, this 7-tonner operated by Durnford and Elliott (Sheffield), Limited, supplier of special steels to B.M.C., is seen taking on a load of steel billets

and fairly level section of road and the acceleration results of 11.1 sec. to reach 20 m.p.h. and 27.7 sec. to reach 30 m.p.h. from rest were the averages of four runs, two in each direction, using low axle ratio and a second-gear start. A check using high axle ratio and first-gear starts gave only slightly longer times but the check speeds were then reached one gear lower in the gearbox in each case. In low axle ratio and direct drive the vehicle pulled away strongly from speeds around 10 m.p.h. without roughness of engine or transmission and further evidence of a good measure of typical diesel slogging power came with the climbing of Polhill in low top, road speed over the crest being 20 m.p.h. Theoretical top speed with standard tyres is just under 46 m.p.h.; on several occasions on open road during the test, a speedometer recording of over 50 m.p.h. was noted and at these speeds the vehicle was entirely stable and controllable. Checked by stopwatch over a measured quarter-mile, the speedometer recorded 1 per cent fast.

As we have said, hill performance generally was good and Bug Hill (1 in 6) proved an easy non-stop climb in low second. In stop-start tests on Hogtrough Hill, a start was just possible on 1 in $5\frac{1}{2}$ in high first and just not possible in the same ratio on the steepest section of this hill, 1 in $4\frac{1}{2}$. Here, however, restarting was easy in low first gear, with plenty of power in hand, and the handbrake held the vehicle comfortably.

No Brake Fade

With this class of vehicle, we have come to expect a fairly high degree of brake fade in our customary check on Titsey Hill. In this test, the vehicle is coasted down the hill for about $\frac{1}{2}$ mile while the speed is held on the brakes to about 15 m.p.h. This limits air flow round the drums, showing up poor ventilation, and gradually heats up the drums and linings to the point where fade occurs. The effects of an emergency stop from 30 m.p.h. at the foot of the hill are observed on the Tapley meter and compared with readings obtained in the normal brake performance tests. Having on occasions recorded readings as low as 30 per cent at this point with some two-axle vehicles grossing around 11 tons, we were agreeably surprised to find that the Austin had sufficient brakes left to lock the rear wheels (the road was wet) and to register 67 per cent on the meter. This compared with readings between 70 and 75 per cent obtained in several measured emergency stops, also carried out on a wet road since rain fell steadily throughout the day.

In continuous running over our standard 15-mile fuel consumption check route between Limpsfield Common and Riverhead on A25, there was rather more baulking from other traffic than usual and the Austin did well to return figures of 15.2 m.p.g. at an average speed of 27 m.p.h. Due to heavy traffic on this rather narrow and undulating route, which includes the villages of Westerham, Brasted, Sundridge and Bessels Green, much use had to be made of accelerator and gears to keep up a good average speed and it was necessary to reverse to turn about at the end of the outward leg due to road work instead of our usual rolling turnaround.

Difficult Conditions

Many operators of Austin-B.M.C. 7-tonners have reported average fuel consumption in service in the region of 20 m.p.g. and judged by our own results fully laden under difficult conditions on a cold day, this sort of result seems perfectly feasible with a vehicle maintained in good condition in trunk operations involving some empty running. Some indication of likely results at the other end of the scale, that is in all laden work on short hauls with a heavy-footed driver in control, is given by the overall fuel consumption figure of 12 m.p.g. recorded in our test. We covered altogether 83 miles, of which 25 miles was in London and its south-west suburbs, and the day's work was characterised by the frequent stops and preponderance of full-throttle driving required to provide figures for our braking, acceleration and hill-climbing tests and numerous other observations.

At £1,525 (subject to £304 15s. 3d. purchase tax in the United Kingdom) for the complete dropside lorry, the Austin-B.M.C. 701 represents the kind of value for money that has been made possible only by the vast technical resources of the British Motor Corporation whose two principal pillars, the Austin and Morris concerns, have their roots deep in the history of the road vehicle industry.

Two new publications issued by Holophane, Limited, are Publication SL.258: Post-Top Refractors, describing prismatic units for pedestal mounting in Group B application, and Publication SL.358: Acorn Bowl Prismatic Refractor, for use with 750-1,000 watt tungsten filament lamps and 400-watt MBF lamps.

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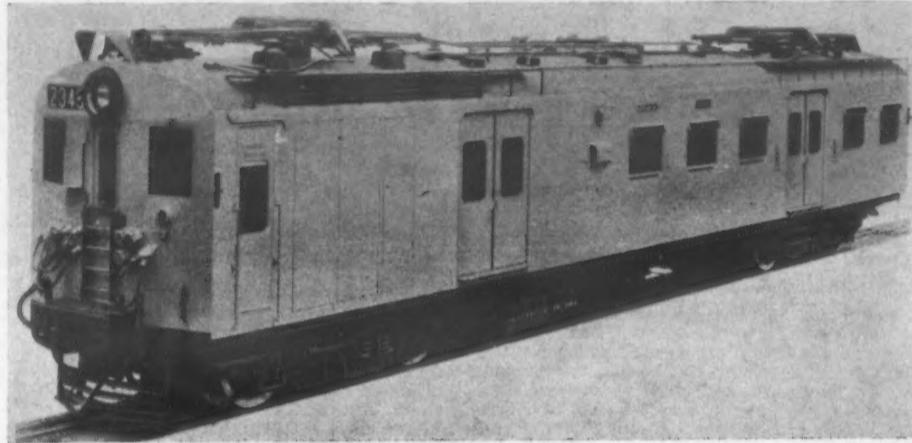
New Suburban Trains for the Reef (Cont.)*

Each bodyside of the stock built by Metropolitan-Cammell Carriage-Wagon Co., Limited, and Birmingham Railway Carriage and Wagon Co., Limited, for the South African Railways Reef suburban electrification has two large doorways equipped with sliding doors. The vestibules are enclosed by four windscreens; they are equipped with luggage racks on the windscreens and two sets of strap hangers, in addition to the doorway grab poles which are sheathed where visible with stainless steel, and the vertical poles in each windscreen. These poles run from carline to underframe and are intended to be semi-structural.

Doors are equipped with Faiveley sympathetic gear; they are arranged to be power-closed by the guard, although they can also be closed

include the frame, bolster and spring planks. The bogies are equipped with large diameter cast steel centre bearings with non-metallic wearing plates and sleeves. Due to the large centre bearings, conventional side bearers are unnecessary, and these are replaced by safety stops which have a nominal clearance of $\frac{1}{2}$ in. on each side.

Bogie springing is by nests of helical springs, damped by Houdaille shock absorbers. In the interests of comfortable riding, the springing has been designed to give maximum deflection under load compatible with the working clearances required between the bogie parts and the underframe. The radial movement of the bolster is controlled at its outer ends by bolster anchors, which flexibly locate it to the bogie side frame. In the case



One of the first-class motor coaches incorporating a baggage van built by Metropolitan-Cammell Carriage and Wagon Co., Limited, for the electric services of South African Railways and Harbours on the Rand

manually. Opening of the doors is always manual but is subject to the overall control of the guard who can, if he so desires, maintain the air pressure in the door engine and prevent general door opening. The design allows for the opening of the doors against the air engine in an emergency by the use of some considerable force, but accidental door opening is not possible.

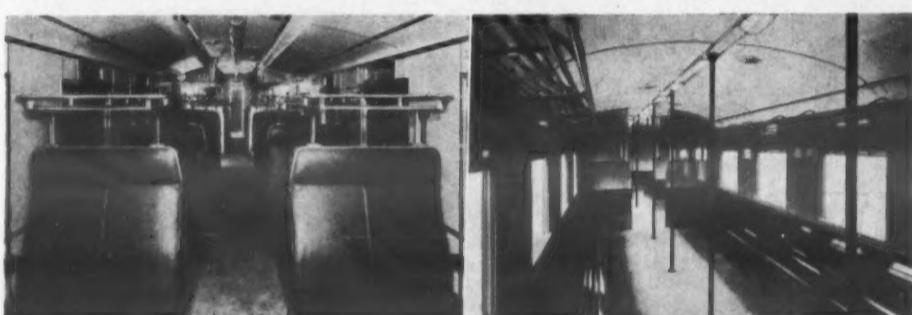
Operation

The electropneumatic operation of the doors is by admission of air to the door engines at 55 lb. per sq. in., when the guard operates the closing button in his van. The operation of this button excites relays located in the underframe which in turn operate electropneumatic valves fitted at cantilever height and which are placed centrally in

the motor bogies both axles are motored, the Metrovick motors being axle hung with their noses flexibly mounted on to the bogie transoms. The bogies are equipped with orthodox equalised clasp brakes operated from the underframes by the usual pull rod linkage. Motor coaches are equipped with four 21-in. vacuum brake cylinders and trailers with two similar cylinders. Skefko self-aligning roller bearing axleboxes are provided.

Motor Coaches

Roughly one-quarter of the length of the motor coach is occupied by electrical equipment compartments, and access to these can only be obtained by operation of the mechanical interlocking gear, which automatically lowers the pantographs and cuts off the power supply. The



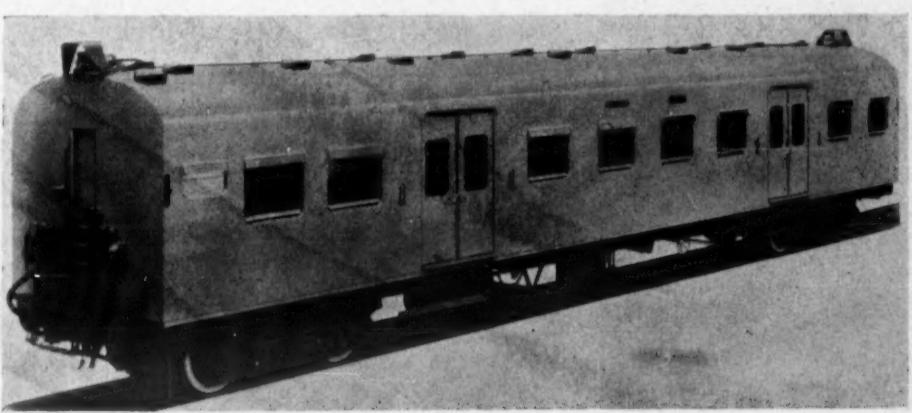
Interior of a first-class motor coach and, right, one of the third-class trailer coaches built by the Birmingham Railway Carriage and Wagon Co., Limited

the bodyside finish between the two doorways served. A separate guard's control box is provided for each side of the train. Visual indication is given of the door positions at every control box, in every driver's cab and outside each doorway. The operating gear has been designed to meet specified S.A.R. requirements in collaboration with the French firm, Etablissements L. Faiveley, and the apparatus has been manufactured at its factory near Paris.

The doors themselves are aluminium alloy castings to B.S.1490.L.M.6, and are of the trackless type, top hung and designed to give a clear doorway at floor level when they are open. All sliding doors are equipped with a fixed window, and for upper class are finished internally by means of an aluminium panel which has been caustic-etched

high-tension and auxiliary h.t. electrical compartments are slightly pressurised to prevent ingress of dust when travelling. The high-tension compartment houses, amongst other items, the main switchgear frame which is mounted so that it may be removed without dismantling.

Two compartments allow for the intake and filtering of the fresh air supply for cooling the traction motors; the air is taken in at the sides of the roof whence it goes into the air settling chamber. From here it travels through a tank of Vokes filters, which occupy the whole area of a cross partition, and into the air intake chamber proper. This compartment houses the booster fans which can be operated by the driver to force-ventilate the traction motors when necessary. Air can also be taken from the settling chamber by



The first-class trailer coaches seat 62 passengers

and anodised. As on the bodysides, the lower portion of each door has a stainless steel kicking panel. Third-class doors also have the stainless steel kicking panel strip, but are panelled in mild steel and painted to match the general finish of the coach.

Bogies

Both motor and trailer bogies are of the cast steel equalising beam type, the structural design and springing being by General Steel Castings Corporation. The castings are manufactured by English Steel Corporation, and the items of cast steel

the traction motors themselves for normal cooling. The ducts to the bogie at the leading end are taken directly downwards from the air chamber and thence to the motors, but those for the trailing end have to travel upwards and between roof and ceiling to the trailing end bay and thence down the bodysides to the underframe. The cross-sectional area of each duct is approximately 100 sq. in. The air connections between the coach body and the motors on the bogies are made by the use of reinforced leather bellows secured to the motor by a clamping ring and to the underframe by a flanged ring.

On the electrical side the current is collected

(Continued on page 16)

CRAVEN

THREE CAR DIESEL TRAINS
for
BRITISH RAILWAYS



Included amongst orders received for over 250 Diesel Railcars for The British Transport Commission's Modernisation Programme are a number of triple car units one of which is illustrated here.



Second class saloon looking forward into drivers compartment.

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400 DIESEL RAILCARS

Already Supplied for

BRITISH RAILWAYS

Modernisation Plan



The 400th Railcar has been delivered from METRO-CAMMELL's Saltley Works for service in the Birmingham Area of the London Midland Region.



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A.S.E.E. EXHIBITION

Brilliance at Earls Court

As was natural, the seventh Electrical Engineers (A.S.E.E.) Exhibition held at Earls Court last week under the sponsorship of the Association of Supervising Electrical Engineers was a brilliant show, with the varied industrial and domestic products of more than 400 exhibitors shown to maximum advantage under illumination provided by all that is latest in the lighting engineer's art. In this particular field, a very special show was made by the Benjamin Electric, Limited, which featured a number of new fittings on its stand—coloured gold in honour of the company's golden jubilee this year.

For many years the company has made a study of lighting problems peculiar to the road vehicle



An installation at Woolton Motors, Liverpool, using Benjamin mushroom fittings showing the wide spread of diffused light

industry and has designed and executed many installations. This work is reflected on the stand by the demonstration of garage and workshop fittings and lighting developed for forecourts and pump islands. New products include an enclosed mushroom fitting to provide a wide spread of diffused light, which can be supplied with poles for 12-ft. high mounting, and plastic cross baffles for the one-by-80W upward-light Fluorolite fitting introduced to provide screening of the source when viewed along the trough and a more attractive appearance than the open reflector.

Safety Fuseboards

Among the wide range of products exhibited by the English Electric Co., Limited, was a new range of fuseboards, designated Red Spot, designed to provide greater safety in industrial installations. Safety has in fact formed the main design consideration in the Red Spot range, which permits the cabling up of spare circuits in a live fuseboard without danger of accidental contact with live metal. Busbars and incoming cable sockets are enclosed in solid insulation and there are insulating shrouds over the fixed contacts in the fuse bases. Shrouds covering the fuse terminals are individually removable. Additional design improvements are the shaping of the fuse carrier so that it is impossible to touch live metal, however awkward the handling, and the sealing from dust and other atmospheric impurities.

Facilities offered by the General Electric Co., Limited, for undertaking complete industrial electrification schemes were featured on this company's stand, where the exhibits represented three typical areas in a modern factory. Cabling and cable accessories of every kind were shown by British Insulated Callender's Cables, Limited, which also featured current-collection equipment, including a fully guarded collector system, and power capacitors for power factor improvement. The British Thomson-Houston Co., Limited, showed the latest in germanium rectifier equip-



A B.T.H. germanium power rectifier cubicle rated at 150 volts 13,000 amp.

ment as well as new types of control panels for cranes and machine-tool drives and a new B.T.H. capacitor d.c. braking equipment. Germanium power rectifiers were also featured by Siemens Edison Swan, Limited, and formed one of the four types of power rectifier equipments exhibited by the Westinghouse Brake and Signal Co., Limited.

Diesel-Electric Engine Cab

A centre of attraction for small boys, and for many not so small, was provided by Brush Electrical Engineering Co., Limited, which showed a full-size mock-up of the cab of the British Railways Eastern Region Type 2 1,250-h.p. diesel-electric locomotive; seven out of the 20 of this type ordered from Brush Traction, Limited, are now in service. Spectacular also and not a little otherworldly in general appearance was the heavy-duty rectifier unit employing cooled-cathode mercury arc bulbs shown as a working exhibit by Hackbridge and Hewitt Electric Co., Limited.

Applications in the electrical industry of that versatile construction material, Dexion slotted angle, which has been used to reduce installation time and cost of fixtures and fittings in so many industries, were shown by Dexion, Limited, which also provided the main means of access to the gallery by twin 35-ft. staircases assembled from over 10,000 ft. of Dexion slotted angle.

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SOCIAL AND PERSONAL

C.N.R. Executives Toured Europe

TWO Canadian National Railways officers, Dr. O. M. Solandt, vice-president, research and development, and Mr. E. Wynne, chief of motive power and car equipment, have recently completed a tour of Europe with a view to seeking operating improvements on their own system. Their investigations, which include a visit to British Railways, led them to lightweight passenger equipment, new types of motive power, operational research, data processing and road-rail integration. The C.N.R. visitors also went to France, the Netherlands and West Germany.

* * *
Mr. H. Norman G. Allen, managing director of W. H. Allen and Sons, Limited, Bedford, has accepted an invitation to become a member of the B.T.C. research advisory council.

* * *
Mr. F. P. Liebert, B.Sc.(Tech.), A.M.I.Prod.E., has been appointed works manager of the English Electric Rugby and Whetstone (Leicester) establishments.

* * *
Mr. R. J. Foster has been appointed area manager for Laycock Engineering, Limited, for the Midlands and North-West England, and Mr. A. Stevens has been appointed Eastern Counties area manager.

* * *
Mr. G. F. Laurence, who joined Metalastik, Limited, in September last year as personal assistant to Mr. M. Goldsmith, chairman and managing director, has been appointed to the board.

* * *
At its recent meeting the board of the Railway Benevolent Institution granted annuities to 11 widows and seven members involving an additional liability of £385 2s. od. per annum; 75 gratuities were also granted amounting to £730 to meet cases of immediate necessity.

* * *
As briefly recorded last week, Mr. Monty Prichard, M.C., hitherto deputy managing director of F. Perkins, Limited, has been appointed joint managing director of the company with Mr. Frank Perkins, who now becomes chairman and joint managing director. Mr. Perkins has decided to relinquish some of his executive responsibilities. Mr. Prichard joined Perkins as personal assistant to the chairman in 1953 and became a director in charge of engineering, in 1954. He was appointed deputy managing director in 1956. Educated at Felsted School, Essex, he began his career with the

Lister-Blackstone group of companies, joining its agents in East India in 1936. Throughout the 1939-45 war he saw service in Burma and the Far East, returning to Lister-Blackstone where he held senior positions in the organisation both overseas and in Britain. He was appointed to that group's board in 1952.

* * *
On April 1 Captain St. John Cronyn, C.B.E., D.S.O., R.N., was succeeded by Lieut.-Col. A. D. Mulligan as hon. secretary, Transportation Club.

* * *
Mrs. Ada H. Pryce, an old lady who lived in Machynlleth, Montgomeryshire, who died recently left a legacy of £150 to the staff (22 men) at Machynlleth depot of Crosville Motor Services, Limited, as "an acknowledgement of the courtesy and consideration shown to her by our staff during her lifetime."

* * *
At a function held in Newcastle upon Tyne, Mr. W. T. James, chairman of the Northern General Transport Co., Limited, and associated companies, presented gifts to two employees who completed 50 years' service and three employees who completed 40 years' service, and certificates and medals to eleven employees who completed 25 years' service.

* * *
Mr. C. Lofthouse, A.M.I.C.E., engineer (main-tenance, Northern district and new works), North Eastern Division, Leeds, has been appointed divisional engineer of that division of British Transport Waterways. He started his career on the waterways in 1925 with the former Aire and Calder Navigation Company and, on nationalisation, became engineering assistant (civil) in the North Eastern Division. He had occupied his last position since 1956.

* * *
Mr. S. F. Major, F.R.I.C.S., estate and rating surveyor, North Eastern Region, B.R., retired on March 28, having served the railways for almost 47 years. His railway service began in 1911 with the Great Western Railway in the surveyor's and estate department. In 1951 he was appointed estate surveyor, North Eastern Region, and became estate and rating surveyor in 1956. He is succeeded by Mr. C. L. Smith, F.R.I.C.S., who joined the Southern Railway at London Bridge in 1925 and has been assistant estate and rating surveyor, North Eastern Region, also since 1956.

* * *
The 1957 James Clayton prize of the Institution of Mechanical Engineers has been awarded to Mr. A. W. Davis, D.Sc.(Glas.), M.I.Mech.E., for his contributions to the design, development and manufacture of gears for marine application, communicated in part in a Thomas Lowe Gray lecture delivered to the Institution and to Mr. P. de K. Dykes, Ph.D., M.A., M.I.Mech.E., for outstanding research and experimental work in the field of the behaviour and functioning of piston rings for high-speed internal combustion engines. This work was communicated in part in a paper presented to the Institution during 1957.

* * *
We regret to record the death of Mr. Henry S. F. Lansdown, M.Inst.T., who in 1941 retired from the position of operating manager, Central Buses, London Passenger Transport Board. He joined the London Road Car Co., Limited, in 1895, as a clerk; when it was amalgamated with the London General Omnibus Co., Limited, in 1908 he was appointed cashier. He became operating superintendent in 1913, assistant operating manager in 1932 and continued with a revised title in this capacity when the London Passenger Transport Board was formed and went to his final position in 1936. He was a foundation member of the Institute of Transport. He was 80 years of age.

The late Sir James Swinburne

WE regret to record the death of Sir James Swinburne, F.R.S., who on February 28 celebrated his hundredth birthday. It was only in 1948 that he ceased to be chairman of Bakelite, Limited, but he was honorary president of the company. His original work on phenolic resins at the beginning of the century made a major contribution to the development of the modern plastics industry. During his long life Sir James Swinburne followed numerous interests. In addition to being a fellow of the Royal Society, he is a past president of the Institution of Electrical Engineers and of the Faraday Society, and a member of the Institution of Civil Engineers. Sir James Swinburne's connection with the plastics industry was unbroken from 1904, when he began his work on phenolic plastics. But before this he was a practising consulting engineer and to him are attributed at least two outstanding examples in the vocabulary of electrical engineering, the words "rotor" and "stator." One day he was shown, as an interesting but useless novelty, a piece of synthetic resin made by an Austrian chemist named Luft. He decided to investigate the possibilities and in order to do this established a laboratory in London in 1904.

* * *
Mr. H. Leach, assistant (passenger services) to the commercial officer, L.M.R., has retired after 47 years' service.

* * *
Mr. W. McCoubrey, who was appointed to the board of the British and Irish Steam Packet Co., Limited on January 1, has been promoted from assistant general manager to general manager.

* * *
Mr. A. Patten Wilson has been appointed manager for Belgium (also responsible for the Netherlands and Luxembourg) for Trans-Canada Air Lines. He has been T.C.A. European agency and interline sales manager since 1952.

* * *
Mr. J. C. H. Brash, appointed district operating superintendent, Glasgow (North), Scottish Region, B.R., was educated at King's School, Warwick, and the University of Edinburgh, where in 1935 he graduated B.Sc. (Engineering). In 1936 he joined the L.M.S.R. at Dalmuir as a traffic apprentice. Mr. Brash enlisted in the Royal Engineers (Transportation) in 1940 and served with 153 Railway Operating Company in Persia and Italy. Later he became D.A.D.Tn. Villach before being demobilised in 1946 with the rank of major. He was mentioned in despatches and awarded the M.B.E.

(Military) for services in Italy. After the war he was a member of H.Q. 18 Railway Group in Supplementary Reserve, R.E. Returned to civil life, Mr. Brash was appointed to the department of the operating manager, Glasgow, and later occupied positions in the offices of the district goods and passenger manager, Perth, and district traffic superintendent, Perth. He was appointed assistant to the district operating superintendent, Edinburgh, in 1949, and in 1952 became assistant district operating superintendent, Edinburgh. In 1956 he was appointed electrification assistant to the chief operating superintendent, Glasgow.

* * *
At a social function in honour of Mr. R. C. Hunt, for 27 years chief engineer of the Trent Motor Traction Co., Limited, and who retired on March 31, Mr. W. Leese, general manager of the company, presented him with a television receiver on behalf of all the employees of the company.

* * *
The Wilmett Breeden group of companies, is sponsoring two fellowships, each worth £1,000 per annum, one at the University of Birmingham and the other at the College of Technology. The successful candidates will divide their time between the university or college and the company.

* * *
Mr. D. I. Grant, formerly executive assistant, becomes C.N.R. vice-president, associated services, with jurisdiction over, *inter alia*, hotels and communications. Mr. R. H. Tarr has been made vice-president and secretary with added responsibilities in connection with the organisational functioning of the system.

* * *
H.M. the Queen as sovereign head of the Grand Priory in the British Realm of the Most Venerable Order of the Hospital of St. John of Jerusalem, has been graciously pleased to promote Mr. H. A. Short, general manager of the North Eastern Region, British Railways, from Officer Brother to Commander Brother of the Order.

* * *
On March 31 there was unveiled, before a large company of present and past officers, in the chairman's room of the London Transport Executive a portrait of the late Mr. Frank Pick, formerly vice-chairman of the London Passenger Transport Board. The portrait is, of course, a posthumous one. The artist is Mr. Patrick Larking, R.O.I.

* * *
Messrs. A. J. Clark and Mr. E. Bateson are retiring shortly from the partnership in Rendel, Palmer and Tritton, but will join the group of consultants which is maintained. Messrs. H. Scrutton, M.I.C.E., M.I.Struct.E., H. F. Merrington, M.I.C.E., and B. G. R. Holloway, M.I.C.E., M.I.Struct.E., senior engineers for many years, are being admitted to partnership to replace these gentlemen and also Mr. F. A. Greaves, a further partner, whose death we have to record a few days after his retirement was announced.

* * *
Mr. G. G. Roberts, M.Sc., A.F.R.Ae.S., formerly director of research, Smiths Aircraft Instruments, Limited, Cheltenham, has now been appointed technical director, following upon the resignation of Mr. E. B. Moss. With Mr. J. E. N. Hooper of the Ministry of Supply, Mr. Roberts was presented with the Musick Trophy by Mr. R. M. Campbell, Acting High Commissioner for New Zealand, on March 27. The trophy is awarded to the group or individual which makes the most practical contribution to the safety of aircraft with special regard to trans-oceanic aviation. Mr. Roberts and Mr. Hooper share the award for work they did on cloud and collision warning radar at the Royal Radar Establishment, Malvern.

FOR MAIN LINE FREIGHT DUTIES



MORE DIESEL ELECTRIC LOCOMOTIVES FOR BRITISH RAILWAYS

Ten of these Bo-Bo 800 h.p. 68-ton units have been built by British Thomson-Houston Co. Ltd., to the general requirements of the British Transport Commission.

They are fitted with

 WESTINGHOUSE 

BRAKE EQUIPMENT

Combined vacuum-air braking is fitted, with air brakes on the locomotive operated, through a proportional valve, in conjunction with the vacuum brakes on the train controlled by the driver's vacuum brake valve. There is a straight air brake valve to control the locomotive brakes when required.

The equipment includes deadman's control, sanding, whistle, and engine control.

Air is supplied by a CM38 compressor, and the vacuum by two 4V110 exhausters.

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Westinghouse Brake & Signal Co. Ltd., 82 York Way, London, N.1

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Associated in Australia with—Westinghouse Brake (Australia) Pty. Ltd., Concord West, N.S.W.

Associated in South Africa with—Westinghouse Brake & Signal Co. S.A. (Pty.) Ltd., Johannesburg

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IMPORTANT CONTRACTS**BAGHDAD BUS ORDER FOR A.C.V.**

CONFIRMATION has been received by A.C.V. Sales, Limited, of an order for a further 100 complete double-deck buses for Baghdad Transport Services, worth £750,000. The buses will supplement the large A.C.V. fleet comprising 20 double-deckers and 300 single-deckers, which have been in service in Baghdad for over six years, and the order underlines the operator's confidence in the qualities of this company's products. The new buses will be completely built by the A.C.V. group, the chassis by A.E.C., Limited, Southall, and the bodies by Park Royal Vehicles, Limited.

Dunlopene for Routemaster

The 850 RM-type buses at present on order for London Transport are being upholstered with Dunlopene, a lightweight plastic foam manufactured by Dunlop.

Winston Electronic Equipment for S.A.

Winston Electronics, Limited, Shepperton, which entered the South African market 18 months ago, has received orders totalling £40,000 for telecommunications and electronic equipment from its agent, R. Hamilton Ross, in South Africa.

Waterways Contracts

British Transport Waterways has announced the following contracts:

Herbert Morris, Limited, Loughborough, for one 6-ton mobile crane for Northwich repair yard, on the Weaver Navigation.
J. I. Johnston and Co., Limited, London, W.12, for one 1-ton Rapier shop truck crane for Brentford warehouse, on the Grand Union Canal.

British Instruments for Luftwaffe

A comprehensive range of flight, engine and navigational instruments produced by Smiths Aircraft Instruments, Limited, have been specified by the German Air Force not only for British aircraft but also for German and Italian designed machines ordered for Luftwaffe service.

Pakistan Railways Orders British

Metropolitan-Cammell Carriage and Wagon Co., Limited, has received an important export contract for 1,365 4-wheeled covered wagons for Pakistan Railways. This repeat order is valued at more than £1 million and has been won in the face of keen worldwide competition. A £2½ million order for goods vans and cattle wagons placed by Pakistan Railways with R. Y. Pickering was reported in our last issue.

Scottish Tapestry for S.A.A. Aircraft

More than 3,000 yards of Replin, a machine-woven tapestry produced in Scotland, has been ordered by South African Airways. The fabric incorporates the Protea flower in its design—the national emblem of the Union—and will be used both in new Vickers Viscount aircraft and in the company's existing machines. The British Replin mill at Ayr, Scotland, is the only textile organisation known to be capable of producing a tapestry material of the kind, in which the design forms an integral part of the fabric.

Heaters for Electric Rolling Stock

The General Electric Co., Limited, has received an order from the Eastern Region, British Railways, for 8,960 convector-type heaters to be installed in new multiple-unit rolling stock for the region's forthcoming 25,000-volt 50-cycle single-phase electrifications. The heaters are of 500-w rating and are required to operate on a nominal 240-v supply derived from the motor coach transformer, with a possible maximum of 315 v. Elements are Alumbro-sheathed and fitted into mild steel cases with expanded metal front covers. This order follows one for 448 water heaters of 1-gal. capacity for the same rolling stock which was placed with the G.E.C. last year.

TENDERS INVITED

THIS following items are extracted from the Board of Trade Special Register Service of Information. Inquiries should be addressed, quoting reference number where given, to the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London, W.C.1.

April 14—**Jordan.**—Jordan Phosphate Mines Company for 25 ARTICULATED LORRIES of 25-ton capacity for haulage of phosphates. Tenders, giving full technical details and delivery date to the Jordan Phosphate Mines Co., Limited, P.O.B. 30, Amman. (ESB/8315/58.)

April 16—**Korea.**—International Co-operation Administration for seven diesel CRAWLER TRACTORS of over 100 h.p. with bulldozers. Photocopies of tender documents from Export Services Branch, B.O.T., price 7s. (ESB/7835/58/ICA.)

April 25—**Thailand.**—Royal Irrigation Department for 30 15-ton-gross diesel-engined LORRIES and 100 15-ton-gross diesel-engined DUMP LORRIES. Tenders to the Royal Irrigation Department, Bangkok. (ESB/20837/58.)

April 25—**Portuguese East Africa.**—Ports, Railways and Transport Department for quantities of rails and other TRACK equipment. Copies of tender documents (in Portuguese) available on loan from Export Services Branch, B.O.T. (ESB/2862/58.)

April 26—**Iraq.**—Iraqi State Railways for 15 metre-gauge DIESEL-ELECTRIC LOCOMOTIVES. Tender documents from the Directorate-General of Railways, Baghdad West, for IDs. 25 per set. (ESB/831/58.)

SHIPPING and SHIPBUILDING**Uni-Directional Turbines**

FEATURES of the British Thomson-Houston propelling machinery in the forthcoming 45,000-ton P. and O. liner *Canberra* have been released by the maker, which says that they may give an indication of future trends. Two 32,000-kVA single-cylinder propulsion turbines will normally supply independently two double-unit 42,500-s.h.p. propeller motors each driving one of the two screws. As propeller reversals will be obtained electrically, the turbines are uni-directional and, consequently, no limitation of steam conditions is necessary during manoeuvring; nor is there any limitation to the astern power available. Full power astern may be a feature of particular importance in future ships; turbo-electric drive may be employed for nuclear propulsion where safety may demand rapid manoeuvring in an emergency. In the *Canberra* advantage has been taken of the flexibility offered by the electric drive in the arrangement of the propelling machinery, by placing the engines well aft to leave the amidships clear for passenger accommodation. This flexibility, due to there being no mechanical connection between the prime movers and the propeller shafting, may be expected to show to advantage in the nuclear-powered ship, where the positioning of the atomic reactor will certainly be determined more by safety and weight conditions than by optimum engine-room layout.

Swedish Ice Breaker

A POWERFUL diesel-powered icebreaker, the 3,370 gross ton *Oden*, has recently been delivered to the Swedish Government by the Wartsila-Koncernen A/B, Helsinki. She has four propellers, two in the stern and two in the bows; it is claimed that these produce a strong symmetric flow around the bows which results in decreased friction between the hull and the ice. They also confer a high degree of manoeuvrability enhanced by control from the bridge.

Topics at Shipping Congress

JAPANESE shipowners have announced that they will send two representatives to a general meeting of the International Congress of Shipping to be held in London from April 16. Japan is said, would take a "very careful attitude" to a proposed plan of Greek shipowners for laying up and dismantling of outmoded ships to stabilise the present depressed freight market. Japanese owners, however, would not wish to align themselves with Greek owners over the question of flags of convenience, which was also likely to be discussed at the conference as one of the causes of excessive competition in world shipping markets. The Japanese delegates might make proposals of their own to stabilise the freight market.

Liberian Reply to Critics

THERE was no question of owners coming under the Liberian flag to avoid their obligations to their crews, or to their home countries, claimed Mr. C. L. Simpson, the Liberian ambassador, in London last week. Wages, conditions, manning scales and safety in ships sailing under "flags of convenience" could now be compared favourably with those in ships of the European maritime nations, added Mr. Simpson. "We did not invent our taxation system to attract foreign owners to register under our flag," he said. "We see no reason why, because some people object to this, we should now change our taxation system to suit the critics. I do not pretend that it does not pay us—although that can be exaggerated—to have these ships registered under the Liberian flag."

S.A.R. MULTIPLE-UNIT STOCK

(Continued from page 13)

by two pantographs from an overhead wire which has an average potential of 2,900 volts, varying under normal working conditions between 2,700 and 3,200 volts. The control is of the electro-pneumatic type employing both unit and drum switches housed in the high-tension compartment and remotely controlled from the master controller in the drivers' cab. The auxiliary supply of control current is obtained from a motor generator set mounted on the underframe, the motor being driven from the 3,000-volt line supply while the generator supplies current at 110 volts. In the event of failure of this set, control supply can be obtained from the other motor coach.

The four traction motors are connected permanently in pairs in series, so that each, while insulated for 3,000 volts to earth, has only 1,500 volts across its terminals. The pairs are operated in series or in parallel; one stage of field weakening is provided through two inductive shunts.

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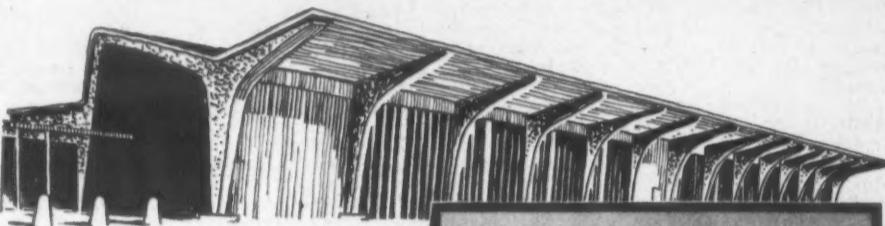
This is typical of the extra service being obtained from our CY Alloy Brake Blocks—which although remarkably resistant to wear, have no adverse effect on loco tyres. This is one of our most popular applications. After exhaustive tests many of the best known manufacturers of locomotives fit CY brake blocks as standard.

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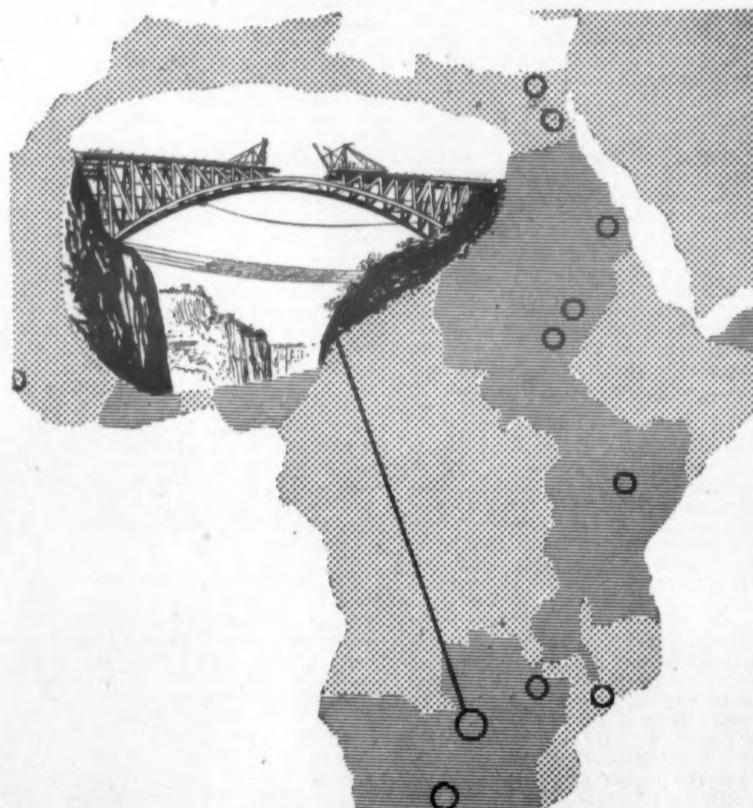
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